JANUARY 22, 1938

17628

THE LANCET

Offices: 7, ADAM STREET, ADELPHI, W.C.2.

Telegrams: LANCET, RAND, LONDON. Telephone: TEMPLE BAR 7228 and 7229.

No. IV., OF VOL. I., 1938. LONDON, SATURDAY, JANUARY 22, 1938. Pp. 120—Price 1s.
No. 5969. VOL. CCXXXIV. Founded 1823. PUBLISHED WEEKLY. Registered as a Newspaper. Annual Subscription: Inland £2 2s. Abroad £2 10s.

OXFORD MEDICAL PUBLICATIONS.

SEE PAGE 2.

NOW READY. SECOND EDITION.

DISEASES OF THE RECTUM AND COLON
AND THEIR SURGICAL TREATMENT.
BY
J. P. LOCKHART-MUMMERY,
F.R.C.S. ENG., M.A., M.B., B.C. CANTAB.,
Emeritus Surgeon to St. Mark's Hospital.
Pp. viii + 616, with 247 Illustrations. Price 35s.
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

9 Plates and 135 Text Illustrations. 15s. net; postage 6d.
DISEASES OF THE
EAR, THROAT AND NOSE.
By J. DOUGLAS McLAGGAN, F.R.C.S. Eng. and Edin.
Surgeon in charge, Ear, Nose and Throat Department, Royal Free Hospital.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C.1.

Free to the Medical Profession on request. Clothbound Ed. 5s.
ARTIFICIAL LIMBS.
"SOLVITUR AMBULANDO."
A Symposium on Prosthetic Achievement.
Pp. 72. 37 Coloured Plates.
"I congratulate you on this interesting, instructive and artistic production. I consider it to be a very great addition to my library."—M.B., Ch.B., F.R.C.S.
J. E. Hanger & Co. Ltd., 7, Roehampton House, Roehampton, S.W.15.

SECOND EDITION.
UROLOGY IN WOMEN:
A HANDBOOK OF URINARY DISEASES IN THE FEMALE SEX.
By E. CATHERINE LEWIS, M.S. (Lond.), F.R.C.S. (Eng.), Surgeon to the Royal Free Hospital; Surgeon and Urologist to the South London Hospital for Women.
¶ "*This book should certainly make and keep for itself a place in urological literature.*"—LANCET.
Pp. viii + 100. With 4 Coloured Plates and 27 other Illustrations. Price 6s.; postage 5d.; abroad 9d.
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

FRACTURES.
By MEURICE SINCLAIR, C.M.G., M.B., CH.B. (EDIN.).
With an Introduction by Sir ROBERT JONES, Bt., F.R.C.S.
Pp. 550. 337 X ray photographs, photographs and diagrams. 24s. net.
Constable & Co., Ltd., London.

129 Illustrations (10 coloured). 12s. 6d. net; postage 6d.
DISEASES OF THE TESTICLE.
By HAMILTON BAILEY, F.R.C.S.
"... all that anyone need know on the subject..."—*Lancet*.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C.1.

STORY OF A GREAT HOSPITAL
THE ROYAL
INFIRMARY OF EDINBURGH 1729–1929
By A. LOGAN TURNER, M.D., LL.D., Hon. F.R.C.P. Edin
Royal 8vo 408 + xvi Pages Photogravure Frontispiece and 34 Illustrations 4 Plans Price 10s. net
OLIVER & BOYD, Tweeddale Court, Edinburgh

ABDOMINAL SURGERY OF CHILDREN
By SIR LANCELOT BARRINGTON-WARD, K.C.V.O., Ch.M., F.R.C.S.
Second Edition. Pp. 348. 97 Illustrations. 4 Coloured Plates.
25s. net.
Oxford University Press, Amen House, London, E.C.4.

"Should be in the possession of every medical man."
—GLASGOW MEDICAL JOURNAL.

URINARY SURGERY.
A Handbook for the General Practitioner.
By W. K. IRWIN, M.D., F.R.C.S.
Surgeon, St. Paul's Hospital for Genito-Urinary Diseases.
"Clearly written...furnishes the practitioner with information of great practical value in his everyday work."—BRIT. MED. JOUR.
SECOND EDITION. REVISED AND ENLARGED.
Price 10s. 6d. (postage 6d.)
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

DISEASES OF THE THYROID GLAND.
WITH SPECIAL REFERENCE TO THYROTOXICOSIS.
By CECIL A. JOLL, M.S., B.Sc., F.R.C.S. (Eng.).
Crown 4to. Fully Illustrated. £3 3s. net.
"No praise is too high for the author of this great book. It must be considered as the standard work on thyroid disease. Its pages summarise all that is known of this most interesting subject at the present day."—WEST LONDON MEDICAL JOURNAL.
William Heinemann (Medical Books) Ltd., 99, Great Russell-street, London, W.C.1.

PRINCIPLES OF MEDICAL STATISTICS
By A. BRADFORD HILL, D.Sc., Ph.D.
Pp. 172 + viii. 6s. net.
The Lancet Limited, 7, Adam-street, Adelphi, London, W.C.2.

J. & A. C. ★ *NEW BOOKS* ★ J. & A. C.

94th Annual Issue. 2,460 Pages. 59,858 Names. 36s.
THE MEDICAL DIRECTORY
1938 London, Provinces, Wales, Scotland, Ireland, Abroad, Navy, Army and Air Force 1938
This issue contains particulars of at least 30,000 changes.
"*This book is one of the indispensable portions of the medical practitioner's equipment.*"—The Practitioner.

MEDICAL BACTERIOLOGY: Descriptive and Applied, including Elementary Helminthology. By L. E. H. WHITBY, C.V.O., M.D., F.R.C.P. *New (3rd) Ed.* 79 Illus. 11s. 6d.
ESSENTIALS OF SURGERY
By C. F. W. ILLINGWORTH, M.D., F.R.C.S.E. 8 Plates and 179 Text-figures. 21s. (*Ready in February.*)
TEXTBOOK OF GYNÆCOLOGY
By WILFRED SHAW, M.D., F.R.C.S., F.C.O.G.
New (2nd) Edition. 4 Coloured Plates and 253 Text-figures. 18s.
A SHORT TEXTBOOK OF MIDWIFERY
By G. F. GIBBERD, M.S., F.R.C.S., M.C.O.G. 187 Illustrations. 15s. (*Ready in February.*)
J. & A. CHURCHILL Ltd., 104 Gloucester Place, LONDON W.1

Valentine's Meat-Juice

In **Hospital** and **Private Practice** and **in their own persons** when ill, **Physicians** have **demonstrated** the **power** of **Valentine's Meat-Juice** to **Sustain** and **Strengthen** the weakened **Vital Forces** when the **Digestive Organs** are **Impaired.**

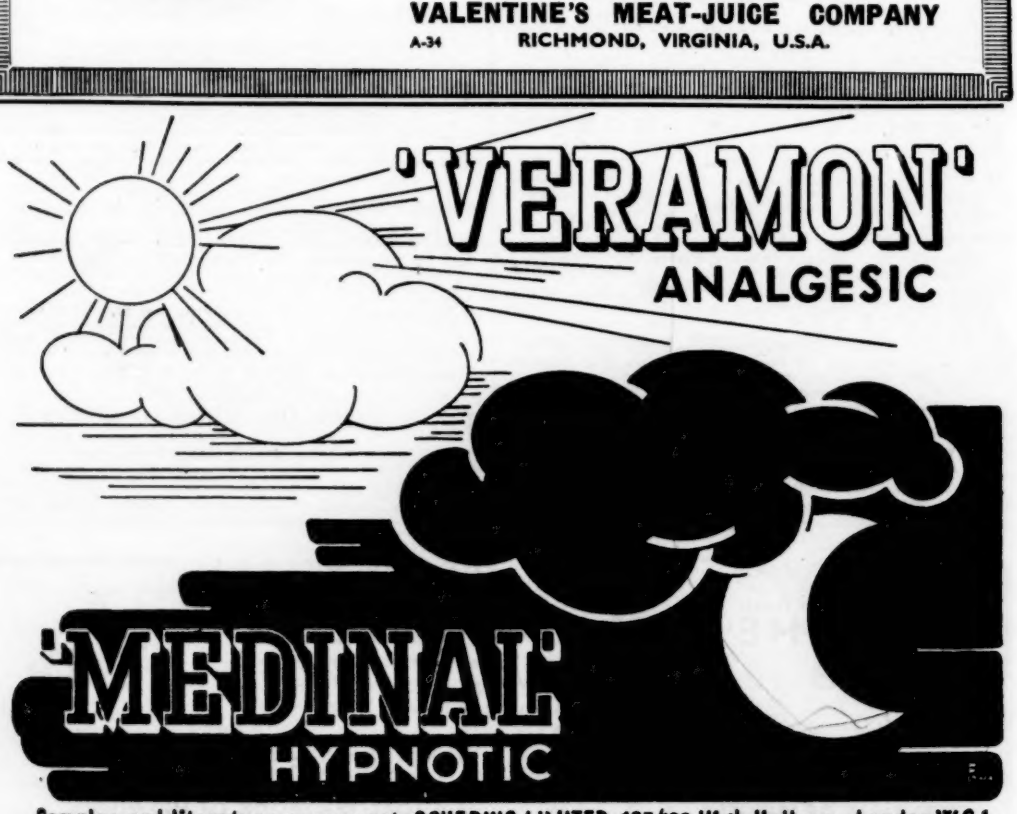
Debility, Exhaustion and Anæmia

Ross H. Skillern, M.D., *Laryngologist, Rush Hospital for Consumption, Philadelphia, Pa.:* "I, myself, had the misfortune to be seized with an attack of Cerebro-spinal Meningitis and after a critical illness recovered. My mainstay during the attack was VALENTINE'S MEAT-JUICE, and I can assure it materially aided in my recovery."

For Sale by European and American Chemists and Druggists

VALENTINE'S MEAT-JUICE COMPANY

A-34 RICHMOND, VIRGINIA, U.S.A.



Samples and literature on request • SCHERING LIMITED 185/192 High Holborn • London W C 1

JANUARY 22, 1938

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, CHEMISTRY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS

No. 5969 LONDON: SATURDAY, JANUARY 22, 1938 CCXXXIV

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT

ADDRESSES AND ORIGINAL ARTICLES

The Rôle of Active or Passive Immunisation in the Control of Enteric Infection. By Prof. W. W. C. TOPLEY, F.R.C.P., F.R.S. 181
Normal Ventriculograms in Tumours of the Cerebral Hemispheres. By J. PENNYBACKER, F.R.C.S., and S. P. MEADOWS, M.R.C.P. (*illus.*) 186
Indications for Collapse Therapy in Pulmonary Tuberculosis. By Dr. W. BEHRENS 190
Serum Reactions after Injection of Concentrated Therapeutic Serum. By HILDA M. DAVIS, M.D. 193
Preparation 2020: A New Blood-pressure Raising Drug. By F. AVERY JONES, M.R.C.P. With observations on its use in Asthma. By C. WILSON, D.M. (*with charts*) 195
Nature of the Subcutaneous Spherules in Some Cases of the Ehlers-Danlos Syndrome. By F. PARKES WEBER, F.R.C.P., and JANET K. AITKEN, M.D. 198
Fatal Infections by Hæmolytic Streptococcus Group B. By R. M. FRY, M.R.C.S. 199
Incidence of Weil's Disease Among Coal-miners in Northumberland and Durham. By W. G. A. SWAN, M.R.C.P., and J. A. MCKEON, M.B. .. 201

MEDICAL SOCIETIES

Royal Society of Medicine: Section of Medicine: The Asthma Problem .. 202
Section of Therapeutics and Pharmacology: Nutritional Therapy in Pregnancy 203
West London Medico-Chirurgical Society: Sterility or Infertile Marriage 205
International Ophthalmological Congress: Retinal Hypertension 205

REVIEWS AND NOTICES OF BOOKS

Pulmonary Tuberculosis in Practice. By R. C. Wingfield, F.R.C.P. ... 207
Chemical Methods in Clinical Medicine. By G. A. Harrison, M.D. .. 207
Radiation Therapy. By Prof. Ira I. Kaplan, M.D. 208
The Cerebro-spinal Fluid. By H. H. Merritt, M.D., and F. Fremont-Smith, M.D. 208
British Journal of Children's Diseases 208

LEADING ARTICLES

EARLY TO RISE 209
VITAMIN D_2 AND VITAMIN D_3 209
OXYGEN-LACK IN MENTAL DISORDER 210
INFANTICIDE 211

ANNOTATIONS

Posthumous Honours 212
Agreement Among Cardiologists 213
Poliomyelitis in New York 213
Mortality Experience Among Industrial Policyholders 213
Dogs as Paratyphoid Carriers 214
Short-Wave Therapy in Tuberculosis 214
Experimental Intestinal Distension 214
Pathogenesis and Treatment of Angina 215
Prematurely Aged Ex-Service Men 215
The New Guy's 216
The Ace of Libraries 216
Educating our Masters ... 216

GRAINS AND SCRUPLES

From a Bacteriological Back-number (IV) 225

PANEL AND CONTRACT PRACTICE

Messages: The Drug Tariff—Road Traffic Act 226

SPECIAL ARTICLES

Early Diagnosis and Prognosis of Lobar Pneumonia in Relation to Serum Therapy. By R. CRUICKSHANK, M.D., and J. A. MONTGOMERY, M.D. 217
Standardisation of Precordial Leads 221
Scotland: Voluntary Hospitals 222
Vienna: Diabetics with Coronary Thrombosis .. 222
United States of America: Compulsory Blood Test in Pregnancy 223
A Psychiatric Research Bureau 223
Medicine and the Law: Private Car Used as Ambulance—A Dispensary an Offensive Business 224

THE LANCET 100 Years Ago 206

CORRESPONDENCE

Transfusion of Fluids in Infancy (Dr. R. Carter) 227
Pharyngeal and Laryngeal Nystagmus (Dr. H. R. Spencer) 227
The London M.B. Final (Sir E. Graham-Little, F.R.C.P., M.P.) 227
The Dangers of Thorotrast (Dr. Z. Leitner) 228
Gastro-intestinal Signs of Nutritional Deficiencies in Children of School Age (Dr. E. H. Wilkins) 228
Vitamin-C Deficiency (Mr. S. S. Zilva, D.Sc.) 229
"Revolt of the Doctors" in America (Dr. J. R. Earp) 229
Fomentations or Lymphatic Control? (Dr. J. L. Aymard) 230
Who Pays the Doctor Called to an Accident? (Mr. L. E. A. Bedwell) 230

INDEX NOTICE

THE LANCET, Vol. II, 1937 216

PUBLIC HEALTH

Vital Statistics for 1937—Control of Disease Spread by Aircraft 231
Infectious Disease in England and Wales 233

OBITUARY

Malcolm Brice Smyth, M.B. 232
Ernest Edward Austen, F.Z.S. 232

THE SERVICES

Army Dental Corps 238

MEDICAL NEWS

University of Oxford 233
Royal College of Surgeons of England 233
International Congress for Microbiology 233
University of London 234
Society of Apothecaries of London 234
Fellowship of Medicine.... 234
St. John's Hospital for Diseases of the Skin, London 234
Congress of Hepatic Insufficiency 234
British Postgraduate Medical School 234
Order of the Nile 234
Malnutrition and Misleading Advertisements 234
Tavistock Clinic 234
Hospitals for Civilian Casualties 234
Progress of Housing..... 234
Westminster Hospital 216
Royal Sanitary Institute 230

NOTES, COMMENTS, AND ABSTRACTS

Diseases Resembling Pellagra in African Children 236
A Varicose Ulcer Survey.. 236
Diphtheria in Lyons..... 237
Tea for Burns 237
The Life and Death of Mok 237
The Hospital Diary 238

Vacancies 234
Medical Diary 235
Appointments 238
Births, Marriages, Deaths 238

H. K. LEWIS & Co. Ltd., MEDICAL PUBLISHERS AND BOOKSELLERS

Textbooks and Works in Medical, Surgical and General Science of all Publishers.

Orders by Post or Telephone promptly attended to. Estimates given for binding. **FOREIGN BOOKS** Catalogues post free on Application. Sets of Periodicals bound to order.

Books advertised or reviewed in this Journal can be supplied from stock or to order.
Medical Stationery, Loose-Leaf Case Books, Card Index Systems, Filing Cabinets, Name Plates in Bronze or Brass, etc. Hand-painted Shields of the Arms of Universities, Hospitals and Colleges.
Department for SECOND-HAND BOOKS, 140 Gower Street.

MEDICAL AND SCIENTIFIC LENDING LIBRARY

Annual Subscription, Town or Country, from One Guinea. *Prospectus on application.*

LIBRARY READING ROOM (first floor) OPEN DAILY TO SUBSCRIBERS. Hours 9 a.m. to 6 p.m. Saturdays to 1 p.m

136 GOWER STREET, LONDON, W.C. 1

Telegrams: "PUBLICAVIT, WESTCENT, LONDON." Telephone: EUSton 4282 (5 lines).

OXFORD MEDICAL PUBLICATIONS

Some recent press comments:—

BIOLOGICAL STANDARDIZATION

By **J. H. BURN,** M.D. Pp. 306. 64 Illus. **21s.** net.

"We predict that for a book of its kind it will be widely read and appreciated . . . this is a book that was widely needed and awaited."—BRITISH MEDICAL JOURNAL.

TEXTBOOK OF GASTROSCOPY

By **NORBERT HENNING,** translated by **HAROLD RODGERS,** F.R.C.S.
Pp. 90. 26 Illus. 7 Col. Plates. **7s. 6d** net.

"Mr. Rodgers has done a further service to English gastroscopists by passing on to them in translation Dr. Henning's admirable little text-book. . . . Succinct, informative, and nicely illustrated. . . . Straightforward and readable; the coloured illustrations are very good."—THE LANCET.

CHRONIC MILIARY TUBERCULOSIS

By **CLIFFORD HOYLE,** M.D., M.R.C.P., and **MICHAEL VAIZEY,** M.B., M.R.C.P.
Pp. 146. 18 Illus. **12s. 6d.** net.

"A welcome addition to the literature of the subject. . . . Should find a place in the library of all those who are interested in tuberculosis."—BRITISH JOURNAL OF TUBERCULOSIS.

THE CONTROL OF TUBERCULOSIS IN ENGLAND

By **GREGORY KAYNE,** M.D., M.R.C.P., D.P.H. Pp. 202. **8s. 6d.** net.

"The reading of it would be a salutary exercise for those who are themselves immersed in the details of tuberculosis and would refresh their general conception of the campaign of which they are a part."—PUBLIC HEALTH.

THE SCIENTIFIC BASIS OF PHYSICAL EDUCATION

By **F. W. W. GRIFFIN,** M.D., B.Ch. Pp. 212. 7 Illus. **7s. 6d.** net.

"This work makes a particularly opportune appearance . . . presents an up-to-date summary of knowledge on the subject of physical education which must be of interest and value to every medical man."—MEDICAL OFFICER.

SKIN DISEASES IN GENERAL PRACTICE (3rd Ed.)

By **H. HALDIN-DAVIS,** D.M., F.R.C.P. Pp. 414. 90 Illus. 7 Col. Plates. **17s. 6d.** net.

"We welcome the appearance of a third edition. . . . The whole book bears the stamp of the author's individual experience, the writing is clear and concise. . . . We can thoroughly recommend this book as it admirably fulfils its purpose."—BRITISH JOURNAL OF DERMATOLOGY.

TWEEDY'S PRACTICAL OBSTETRICS (7th Ed.)

Revised and largely rewritten by **BETHEL SOLOMONS,** M.D., F.C.O.G., and **NINIAN FALKINER,** M.D., F.C.O.G. Pp. 790. 296 Illus. **25s.** net.

"The authors are to be congratulated . . . the new edition can be highly commended to both students and all practitioners interested in obstetrics."—GLASGOW MEDICAL JOURNAL.

Oxford University Press

AMEN HOUSE WARWICK SQUARE LONDON, E.C.4.

ADDRESSES AND ORIGINAL ARTICLES

THE RÔLE OF ACTIVE OR PASSIVE IMMUNISATION IN THE CONTROL OF ENTERIC INFECTION

By W. W. C. Topley, M.D. Camb., F.R.C.P. Lond., F.R.S.

PROFESSOR OF BACTERIOLOGY AND IMMUNOLOGY IN THE UNIVERSITY OF LONDON, AT THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

A general principle that has emerged from the studies of a long succession of descriptive epidemiologists, from the data collected and analysed by medical statisticians, and from the more detailed and precise observations that have been rendered possible by the development of bacteriological technique, is that the prevalence of any infective disease depends on the integrated effects of many different factors. Some of these exert their influence on the hosts at risk, others on the infecting parasites, and others on the complex environment in which hosts and parasites react. It follows that the effective control of herd infection is never a simple problem. It depends on a knowledge of the nature of the parasite concerned, of its methods of attack, of its normal habitat, of its mode of spread, of the possible intervention of insect vectors of infection, of changes in host resistance, naturally or artificially acquired, and of many other factors. Intelligent administrative action demands an assessment of the relative importance of each link in the chain of epidemic causation, and a decision, arrived at in the light of all available data, as to the place, or places, in which that chain may most readily and effectively be broken. It must be noted, also, that the methods best suited to control any given infection will differ in different places and at different times. Thus, in the intestinal group of infections, the main factors concerned in effective control are an adequate system of sewage disposal, a water-supply carefully guarded from excretal pollution, a safe milk-supply, the purification of shell-fish, the control of such insect vectors as the house-fly, the detection of any human carriers who are concerned in the handling of water, milk, or foods, and the shielding of food from contamination by infected rodents. An ancillary measure, in certain intestinal infections at least, is afforded by active immunisation with a bacterial vaccine. In the absence of those sanitary services that afford freedom from the risk of infection, this may become a factor of primary importance. Similarly, if such services suffer from a temporary breakdown, prophylactic inoculation must be considered as a possible emergency measure. It must not, however, be forgotten that careful attention to personal and household hygiene will go some way towards compensating for defective public services.

It happens that recent events have raised afresh the problem of the control of enteric infection in this country, and particularly the rôle that should be assigned to prophylactic vaccination. In discussions in the medical press reference has been made to particular records of events, or expressions of opinion, and, in a general way, to the very extensive literature that has accumulated during the last thirty years or more. Since it would appear that different authorities draw very different conclusions from the same body of evidence, it may not be amiss to summarise that evidence afresh, at the risk of retelling a story that is well known to many. No useful purpose would be served by including in this brief survey an account of recent studies on the antigenic structure of the bacilli of the typhoid-paratyphoid group, since the available evidence in regard to actual events in the field is of an earlier date. We need only note that it is possible that the results that have been obtained in the past may be improved, or rendered more uniform, in the future by the use of more effective, or better controlled, reagents.

PROPHYLACTIC EFFECT OF ACTIVE IMMUNISATION WITH A TYPHOID, OR T.A.B., VACCINE

It will be convenient to begin with a summary of the evidence in regard to the effectiveness of antityphoid vaccination carried out under optimal conditions. Such conditions are provided when the persons inoculated are living in an uninfected area, and will not be exposed to any risk of infection until a week or more has elapsed after the last dose of vaccine has been given. The usual number of doses is two or three, given at 7- or 10-day intervals; so that a person may be regarded as having attained a maximal degree of protection some 14–30 days after immunisation is commenced. The generally accepted view is that this degree of protection is maintained for some months at least, and that a much longer period may elapse before it disappears entirely.

The best figures available are those which were collected by the Antityphoid Committee, and have been submitted to statistical analysis by Greenwood and Yule (1915). They refer to troops proceeding overseas for service in areas where enteric infection is endemic. Of 8664 uninoculated men, 272 contracted the disease during the period of observation, an incidence of 31·39 per 1000. Of 10,322 inoculated men, 56 contracted the disease, an incidence of 5·43 per 1000. The risk of contracting the disease under these particular conditions was, therefore, reduced to about one-sixth as the result of vaccination.

The figures for the epidemiological happenings of the Great War do not allow of any accurate comparison between inoculated and uninoculated men, in part because inoculation became universal in most armies at an early stage, in part because the exigencies of war made the collection of satisfactory statistics almost impossible. The events of 1915 in our own armies in France confirmed the view that vaccination greatly reduced the frequency of enteric fever; and nothing happened during the succeeding years of the war to throw serious doubt on this general conclusion. It should be noted, however, that the disease was by no means eliminated. Thus, among inoculated British troops in France during the four years of war there were 3963 cases of enteric infection (Harvey 1929), while among inoculated men of the American Expeditionary Forces during eleven months' service in France there were 1242 cases (Vaughan 1920).

There are, moreover, certain recorded instances which indicate that, under particular conditions of exposure, antityphoid inoculation may be singularly ineffective. One of the best documented is the account given by Hawn, Hopkins, and Meader (1919) of an outbreak of typhoid fever among a small American contingent. In all there were 98 cases among a company of 248 men, all of whom had been inoculated 6–12 months previously. This would be a strikingly high incidence, even among an uninoculated group.

The history of the outbreak suggested that the men had been exposed to some common source of infection over a short period of time, and it seemed possible that an important factor had been communal bathing in a lake; but the exact mode of spread was not clearly established. Such happenings suggest that antityphoid inoculation, though it reduces the risk from intermittent contact infection, may be much less effective when those inoculated are submitted to severe or continuous risk.

One important point, at least, is entirely clear. Any argument based on the assumption that an endemic or epidemic prevalence of enteric fever can be brought to a speedy and final end by antityphoid vaccination alone can be disregarded. We are concerned with one item, sometimes an exceedingly important item, in a balance of effects, not with a single factor that tips the scales so decisively that all other factors may be ignored.

EFFECT OF ANTITYPHOID VACCINATION IN MODIFYING THE DISEASE

Before discussing the effectiveness of antityphoid vaccination under other, and less favourable, conditions, we may consider its influence on mortality, as contrasted with morbidity. Many authorities believe that, if an inoculated person contracts enteric fever, the disease is less likely to be severe, or fatal, than if it had occurred in an uninoculated person. There are, in the available records, numerous examples of comparative case-fatality rates in the inoculated and uninoculated that support this view; but they are based in considerable part on diagnoses established by agglutination tests. All would agree that this method is less reliable than diagnosis by the isolation of the causative organism from the blood, fæces, or urine; and, if reliance is placed on agglutination tests alone, it is probable that a certain number of atypical febrile attacks will be incorrectly diagnosed as enteric infections. Certain observers, and particularly Vaughan (1920) and Ledingham (1921, 1925), have thrown doubt on the existence, or frequency, of this modified typhoid in inoculated persons. Their careful and valuable studies have shown that, if the diagnosis of enteric infection is limited to those cases in which the causative organism has been isolated, usually from the blood, the severity of the disease in the inoculated, as evidenced by the clinical picture, or by the case-fatality rate, differs in no way from that observed in uninoculated persons. Conversely, among inoculated persons suffering from the characteristic clinical disease, the isolation of the causative organism is accomplished as readily and frequently as in uninoculated patients.

The difficulty of interpreting these facts is obvious. If active immunisation with a T.A.B. vaccine, in addition to reducing the frequency of the disease, lessens its severity in those that are attacked, it will most probably do so by decreasing the intensity and duration of the bacteræmia, and the severity and extent of the intestinal lesions. This will almost certainly result in a clinically atypical illness, and in a lessened frequency of positive blood and stool cultures in patients submitted to ordinary routine examinations. What we lack is an adequate record of repeated blood and stool cultures, carried out by the more effective methods now available, and correlated with the results of agglutination tests, which would allow us to form a better opinion as to the relative frequency of mild atypical infections in the inoculated and uninoculated.

Meanwhile, it should be noted that the views advanced by Vaughan and by Ledingham, even if fully substantiated by future studies, would not justify us in disregarding entirely the low case-fatality rates recorded by several observers in inoculated persons. Where both morbidity and case-fatality rates are given for an inoculated and uninoculated group, the two rates are interdependent. If we exclude those cases in which the causative organism has not been isolated the case-fatality rate will be increased, but the total morbidity-rate will be reduced. In dealing with the gross recorded rates for comparative purposes, the morbidity-rates should clearly be weighted by the case-fatality rates.

EFFECT OF ANTITYPHOID INOCULATION DURING AN ENDEMIC OR EPIDEMIC PREVALENCE

It is clear that the prophylactic vaccination of persons exposed to risk during the period of immunisation is likely to be less effective than when the risk can be postponed until maximal immunity has been established.

The possible disadvantages involved in this procedure may be considered under three heads:

(1) The resistance developed during the immunisation period itself, which may be regarded as lasting about 14–30 days, according to the number of injections given and the intervals between them, may be so slight as to be relatively ineffective.

(2) It is possible that the well-known "negative phase," associated with a decrease in the antibodies in the blood, may induce a transient lowering of resistance after each injection of vaccine.

(3) In the inoculation of any large number of persons already exposed to risk, it is probable that some of those inoculated will be already infected, and such an event may react unfavourably on the course of the infection.

The first and second of these possibilities may conveniently be considered together. There is ample evidence from animal experiments that resistance to the injection of living bacteria, or their toxins, and not merely the antibody content of the serum, increases with repeated injections given at properly spaced intervals, at least during the first few injections of a series; so that we shall expect the level of resistance attained during immunisation to be lower than after its completion. It is far less certain that the "negative phase" is associated with any significant lowering of resistance; and in any case such lowering would probably be very transient. Since there is a very general agreement that the possible effects of this negative phase may be neglected in the inoculation of uninfected persons, it seems unnecessary to discuss this point in any further detail.

When we inquire how far our expectations, based on these animal experiments, are borne out in practice, we are met with the difficulty that the recorded data are, in most cases, not of a kind to permit of any comparison between inoculated and uninoculated persons. On one point there is no doubt at all. The inoculation of existing contacts of typhoid cases, or of persons after their entry into an infected area, or of persons during an epidemic, does not prevent the occurrence of fresh cases. There seems little point in citing particular instances at random from an extensive literature; but, since demands have recently been made for actual records of happenings in man, mention may be made of the occurrence of 72 cases of typhoid among men inoculated on, or soon after, arrival in an American training camp (Lull 1935), of 24 cases among persons

inoculated during a water-borne epidemic of typhoid (Dean 1931), and of large numbers of cases among persons inoculated during the later stages of the great Hanover epidemic (Stroebe 1928).

Such records tell us nothing of the relative morbidity-rates in the inoculated and uninoculated; but Ramsey (1935) has published data on which such a comparison can be made. Ramsey's paper has in fact been quoted during the recent discussion of this problem; but, as Greenwood (1937) has pointed out, the quotation was highly misleading. The figures relate to the incidence of typhoid fever among inoculated and uninoculated contacts of primary cases occurring in different areas in New York State, the inoculations being carried out at varying periods after the primary case was notified. It should be noted that all cases arising during an epidemic were excluded, and that the period of observation covered 90 days from the appearance of the primary case. The cases among the inoculated were divided into those occurring between the first and second injection of vaccine, between the second and third, and after the full course of three doses had been completed. These were compared, according to their time of occurrence in relation to the primary case, with the number of cases that would have been expected during the same time interval, calculated from the actual contact infections among the uninoculated persons in the same households. In each case the inoculated showed an advantage in the total infection rates; but the difference between the inoculated and uninoculated groups in the case of those infected between the first and second, or second and third, doses of vaccine were not statistically significant; nor were they consistent when the total number of households observed were divided into two large groups according to the removal, or non-removal, of the primary case. Ramsey concludes that it is not well established that any substantial protection is afforded during the interval between the beginning and completion of vaccination.

If attention is confined to those persons who completed the course of vaccination without contracting typhoid fever, the result is different. The inoculated show a significant and consistent advantage as compared with the uninoculated. Over the period concerned the morbidity-rate was about four times less in the thrice-vaccinated contacts, an advantage somewhat less than the 6 : 1 ratio recorded by Greenwood and Yule for prophylactic vaccination under optimal conditions.

It should be noted, in this connexion, that the majority of contact infections occur during the first few weeks following the notification of the primary case—that is, during the time when prophylactic vaccination will be in progress—and that the effect on the total number of contact infections will be lessened for this reason.

PROVOCATION TYPHOID

Turning now to the question of the inoculation of those persons who are already infected, though they have not yet shown the clinical symptoms of the disease, we are on entirely different ground. There is ample evidence that fatal infections may follow the injection into experimental animals of dead bacteria, or their products, together with doses of living bacteria that would not be lethal alone. The "aggressin" theory of Bail and his colleagues, elaborated in a long series of papers published during the first ten years of this century, is based on repeated observations of this kind; and the relevant observations themselves have been fully confirmed by many other workers, though Bail's interpretation of them has been subjected to considerable criticism. It may be noted that there are good reasons for believing that the aggressive action of dead bacteria, or their products, cannot be attributed, at least wholly, to the induction of a negative phase, in the usual meaning of that term. It is, indeed, very doubtful whether this aggressive effect is strictly specific in the immunological sense, though it probably includes specific factors.

We are, at least, justified in concluding that the results of animal experiments raise a doubt as to the wisdom of injecting into persons already infected with organisms of the enteric group the customary large prophylactic doses of T.A.B. vaccine.

There seems, however, to be a reluctance among some of those who have recently discussed this problem to draw any inferences from experiments on animals, and insistent demands have been made for records of similar events in man. Some of these demands almost suggest a doubt as to whether such records exist. The doubt is easily removed. There is an extensive literature dealing with the occurrence of "provocation typhoid"—the onset of the disease so soon after antityphoid vaccination as to suggest a relation of cause and effect. Reference may be made to papers by Friedberger (1927) and Stroebe (1928). Those who desire further references will find many in each paper.

The literature of this problem consists, for the most part, in the description of events that suggest, sometimes very strongly, the activation or exacerbation of an already existing infection. Several authors, for instance, quote an account of an outbreak of severe typhoid fever in a certain regimental company, the cases developing 8–14 days after the men had been inoculated, and the case-mortality reaching the unusual figure of 44 per cent. Other similar, but less striking, happenings are on record; though some authors state that they have never observed any such provocative effects.

Some approach to a quantitative assessment of the effect of antityphoid vaccination in those already infected may be attempted by a comparison of the severity of the disease in those falling sick at various intervals after the vaccine has been administered. Stroebe (1928), whose paper is judicial, and who holds no adverse view in regard to the use of antityphoid vaccination under other conditions, has provided data of this kind. In 30 cases of typhoid fever coming under his own observation soon after the patients in question had received a dose of vaccine, he notes that, when the symptoms appeared within two days after the first or second injection, the onset tended to be unusually sudden, with violent and persistent rigors, and the subsequent course of the disease was in most cases severe. Cases in which the initial symptoms developed after longer intervals tended to be milder. This sudden onset, with severe rigors, has been referred to by others who have described cases of provocation typhoid. It was, for instance, noted in the outbreak in the regimental company referred to above. Vaughan (1920), who compares the course of typhoid fever in inoculated men of the American Expeditionary Force in relation to the time elapsing between inoculation and the development of symptoms, notes the frequency of sudden onset in cases occurring within a month of inoculation.

Case-fatality rates in relation to the time elapsing between inoculation and onset are not available in sufficient number, or in sufficiently large groups, to justify any conclusion. There is the recorded

mortality of 44 per cent. in the outbreak of provocation typhoid already referred to, which is far above any normal figure. In Vaughan's records cases occurring within one month after inoculation showed a fatality-rate of 15·2 per cent. This was higher than the average rate for all cases, or than the rates in those later months in which the total number of recorded cases was 20 or over; but the run of fatality-rates was irregular, and little weight can be attached to these figures. In Lull's record of typhoid fever among inoculated men in an American training camp, 2 deaths occurred among 5 persons who contracted typhoid fever within a month of vaccination, as compared with 4 deaths among 67 persons in whom the interval between inoculation and onset was longer; but, here again, no significance can be attached to such small numbers.

The impression left by these and other records is that the occurrence of provocation typhoid, often associated with a sudden onset and a severe course, is a well-attested fact; though the available data do not justify any conclusion as to the frequency of such an event. The doubts raised by animal experiments as to the desirability of inoculating persons already infected are therefore accentuated by experience in man. They must, however, be left as doubts, not as established adverse conclusions. It is at present impossible to obtain any measure of the summed effects of vaccination in infected persons who have not yet developed symptoms of disease, or to tell how far the harm that seems certainly to be done to some of them may be counterbalanced by good that may be done to others. If we take into consideration both the possible induction of provocation typhoid, and the relatively low level of resistance that appears to be attained during the period of immunisation, there seems much force in Stroebe's conclusion that vaccination during the incubation period, or in the presence of latent infection, is a procedure that, on the existing balance of evidence, is better avoided.

VALUE OF ANTITYPHOID VACCINATION UNDER DIFFERENT EPIDEMIOLOGICAL CONDITIONS

When we turn to the practical administrative problem of the control of enteric infection, the picture we have obtained of the effect of antityphoid vaccination under different conditions must, in each case, be fitted into the framework provided by the particular environment with which we are faced. With most of the cases that commonly present themselves we can deal very briefly, for they have been considered inferentially above.

Clearly vaccination with T.A.B. vaccine will be a preventive measure of major importance when persons living in an uninfected area with well-developed sanitary services migrate to another area in which the sanitary services are inadequate and enteric infection is endemic. Even here, however, it should never be allowed to induce a false sense of security, or to lessen the emphasis on other methods of control. Strict attention to military, household, and personal hygiene will go far to reduce the risks run by those stationed in endemic areas, and all possible precautions should be taken along these lines.

A different set of conditions are presented when we are faced with an endemic, or endemic-epidemic, prevalence of enteric infection among a population already living in an area in which the sanitary services are deficient, and cannot be readily or rapidly improved. There are two particular administrative problems that may usefully be considered under this head. There is the case of a labour population, working on mines or plantations. Such persons are already at risk; but, assuming the prevalence to be of the usual smouldering type, there will not, at any one time, be large numbers already infected. Moreover, a prevalence of this type commonly shows seasonal fluctuations, so that it will often be possible to select a quiescent period for vaccination. Under such conditions the risk of provocation typhoid will not be great, though it will not be absent. The balance of probabilities would seem to weigh heavily in favour of the inoculation of all those at risk, and, of course, of all new entrants to the mine or the plantation. This conclusion has been confirmed by the experience on South African mines, and elsewhere. Here, again, there should be no relaxation of effort to make all possible improvements in general sanitary control.

The second case is that of a widespread rural population, disposing of their excreta as best they may, and drawing their water-supply from wells and streams. Under such conditions it is not unusual for scattered foci of enteric infection to develop, sometimes as single cases, sometimes as small outbreaks. The prophylactic vaccination of all inhabitants in such a widespread area, with revaccination at intervals of a year or more, would be administratively very difficult, if not impossible; and, as Ramsey (1934) has emphasised, the probable gain would be in no way commensurate with the effort required, or with the inconvenience caused. If, however, we confine our attention to those who are in close contact with a case, or cases, of the disease, the argument in favour of prophylactic vaccination is stronger, because the risk to which such persons are exposed is greater. It is true that the possibility of inducing provocation typhoid must be considered, and that, as Ramsey (1935) has shown, the protection afforded will be least when the risk of infection is greatest; but his figures clearly suggest that, if we exclude epidemics in which many persons are infected within a short interval of time, the vaccination of contacts will on balance do more good than harm. We shall not, however, "abort" a localised epidemic, or reduce contact cases to negligible proportions. Here, again, great stress should be laid on careful instruction in household and personal hygiene. A possible alternative method of immunisation is discussed below.

THE RÔLE OF ANTITYPHOID VACCINATION DURING A WATER-BORNE, OR MILK-BORNE, EPIDEMIC IN AN URBANISED COMMUNITY

When we turn to the conditions with which we are particularly concerned—the occurrence of a water- or milk-borne epidemic of enteric fever in an urbanised, or partially urbanised, area with an organised system of sewage disposal, and a public water-supply—we are faced with a very different problem. A water-borne epidemic is due to an accidental and transient breakdown in a service that is normally highly efficient. The situation, when such an accident happens, is differentiated sharply from those we have considered above. A proportion of the population living within the administrative area have been simultaneously subjected to a serious risk of infection, the actual number involved depending on the extent of the area supplied with water from the polluted source. As soon as the source of pollution is traced, which will usually be within a week or so of the notification of the first case, and may be much sooner, the water-supply to the affected

area will be rendered safe by chlorination, or by other appropriate means.

We are then faced with the following situation. A certain number of persons, say a few hundred to a few thousand, living within a known and limited area, have been exposed for a limited period, known to have ended on a particular day, to the risk of drinking water polluted with typhoid or paratyphoid bacilli. The remainder of the population living within the administrative district, who may perhaps number many thousands, have not been exposed to this risk. The detection and purification of the polluted water-supply has restored the whole district to a condition of satisfactory sanitary control, so that there is no likelihood of a prolonged endemic-epidemic prevalence, such as commonly follows a large epidemic in an area with inadequate sanitary services. The conditions existing on the detection of a milk-borne epidemic of enteric infection, though differing in certain ways, are sufficiently analogous to demand no separate discussion.

In such circumstances as these, should active immunisation with an antityphoid, or T.A.B., vaccine be employed, and, if so, who among the population at risk should be vaccinated?

Among those living in the area supplied with the polluted water a considerable, but unknown, number are already infected. Some of these are incubating the disease; and we shall expect a crop of new cases, continuing for a month or rather longer, consequent on this original mass-infection. Other persons, who have in fact been infected, will never develop the disease in its characteristic form, though some of them will become carriers. Others again, for one reason or another, will have escaped the initial risk; but some of these will later become contacts of primary cases. Apart from the cases, we cannot tell, during the early and critical stages of the epidemic, to which category any particular person living within the affected area belongs. If we inoculate every person within the area who has not yet developed the disease in an obvious form we shall quite certainly be including many who are in the incubation stage, or who have developed a latent infection. We shall be in the same position if, during the first few weeks of the epidemic, we inoculate only those who are contacts of diagnosed cases. We shall be running a maximal risk of provocation typhoid, and gaining a minimal return in the form of increased resistance during the critical period. It has already been noted that it is impossible, on the evidence at present available, to determine whether, on balance, we are likely to do more harm or good; but, with the position as doubtful as it is, it would seem inadvisable to employ active immunisation with the usual prophylactic doses of vaccine under these particular conditions.

If we turn to those living outside the area primarily affected, the position is entirely different. They have not been exposed to the initial risk, and they may safely be regarded as uninfected. The reasons that render vaccination undesirable, or at best of doubtful value, within the primarily affected area do not apply. The subsequent risk to which these persons will be subjected is very slight, though it is certainly a little greater than in a district in which no recent epidemic has occurred. It seems doubtful whether any attempt to vaccinate all those living in the administrative district, but outside the area primarily affected, would be either practicable or wise. The question seems one for personal decision rather than for administrative action. If any individual, after the smallness of the risk has been explained to him, wishes to reduce that risk still further at the cost of the slight inconvenience caused by antityphoid vaccination, he should, I think, be vaccinated; but I should not expect the aggregate effect of such vaccination to result in any significant reduction in the total number of cases.

AFTERMATH OF A WATER- OR MILK-BORNE EPIDEMIC

One result of any large-scale epidemic due to infected water or milk will be the persistence in the affected area of numerous carriers of typhoid or paratyphoid bacilli, some of whom will have passed through an attack of the disease, while others will not. This persistence of latent foci of infection will not seriously affect the ordinary inhabitants of the district, who will be protected by efficient sanitary services, reinforced by increased vigilance within the home. There may, however, exist within such an area one or more institutions, schools, infirmaries, or the like, in which the aggregation of many persons, and a system of communal feeding, will greatly increase the chances of contact infection. It is arguable that the vaccination of the inmates of such institutions, when the original epidemic has become quiescent, would significantly reduce the risk of fresh infections at a later stage.

PROPHYLACTIC IMMUNISATION WITH AN ANTITYPHOID SERUM

So far we have been discussing active immunisation with an antityphoid, or T.A.B., vaccine. The studies of Felix and his colleagues on the Vi antigen of the typhoid bacillus, and on the corresponding antibody, have reawakened interest in the use of an antityphoid serum for therapeutic purposes, and promising, if as yet inconclusive, results have been recorded (Felix and Pitt 1934, Felix 1935). Experiments carried out during these studies have shown quite clearly that a suitable antiserum, used as a prophylactic agent, will protect mice against a lethal dose of virulent typhoid bacilli. There are, so far as I know, no records of the prophylactic use of an antityphoid serum in man; and those who attach little or no value to the results of experiments in animals may regard it as premature to discuss the indications for the practical applications of this procedure. Since this view is not shared by all, it seems of interest to note that the conditions that tell against the use of antityphoid vaccination during an epidemic prevalence are exactly those that favour passive immunisation with an effective antiserum.

If all those living in the area served by a polluted water-supply received a prophylactic injection of a specific antiserum immediately the pollution was discovered, the injection being repeated 14–21 days later, it seems probable that a significant degree of protection would be afforded for a total period of some six weeks or more—that is, throughout the period of maximal risk. By the time the passive immunity had waned, the risk would have become slight, or negligible. I should guess, though one can do no more than guess until a trial has been carried out under field conditions, that the number of cases and deaths might in this way be very greatly reduced. If we admit arguments from analogy, as well as from animal experiments, this guess is rendered somewhat more probable by the success that has attended the use of convalescent or adult serum in the protection of measles contacts. In any case we shall be using a method that may perhaps do much good, while it is very unlikely to do harm; and this would seem to be a sufficient reason for urging an adequate trial when the next emergency occurs. It should, perhaps,

be added that the probable occurrence of a certain number of cases of serum sickness must be taken into account.

It is hardly necessary to add that passive immunisation with a specific antiserum would be an entirely unsuitable procedure in those conditions which are most favourable to active immunisation with a T.A.B. vaccine—armies or individuals proceeding from uninfected to infected areas, labour communities living in an endemic area with defective sanitation, or those exposed to particular risks of contact infection during the aftermath of an epidemic. In all such cases a long-lasting immunity is required. In the remaining situation that we have considered, that of contacts of primary cases under the conditions dealt with by Ramsey (1935), passive protection with a specific antiserum is at least worth a trial, since, as a matter of experience, the great majority of contact infections are contracted during the period in which it would still exert its effect.

RELATION OF ACTIVE OR PASSIVE IMMUNISATION TO OTHER MEASURES OF CONTROL

Although the main purpose of this paper has been to discuss the rôle of active or passive immunisation in the prevention of enteric infection, the importance of other factors has been frequently stressed; and, in conclusion, it will be well to emphasise this aspect of our problem in relation to those water-borne, or milk-borne, epidemics with which we have been mainly concerned.

It is not within the province of a bacteriologist to discuss, in any general way, the administrative measures which should be employed to prevent accidents of this kind; but it is permissible to note a few points which depend directly on bacteriological control. So far as water-supplies are concerned there are strong arguments in favour of the view that continuous bacteriological control should be a routine procedure; and "continuous" means that samples should be examined daily, except perhaps in certain areas in which the possibility of excretal pollution can be almost excluded. Even here, the added safeguard would be highly desirable. In such daily tests a simple examination for the presence and number of coliform bacilli would meet all essential requirements. More complete examinations should be carried out at longer intervals. Any supply that is shown to be liable to pollution should be adequately and continuously treated, and the treatment should be bacteriologically controlled.

In regard to milk-borne epidemics there is a growing body of opinion that the bacteriological and epidemiological evidence now available has established a clear case for the compulsory pasteurisation of all milk-supplies. This measure would reduce the incidence of many infections in addition to enteric fever.

It should be noted that polluted water may exert its effect, as at Bournemouth, by the secondary pollution of milk. It is clear also that, in any district in which a major outbreak has occurred, the chances of the infection of milk by a carrier will, for some months at least, be considerably increased. A wise precaution, for the protection of the residents within such a district, would be the pasteurisation of all milk-supplies, or the boiling of all milk that cannot be pasteurised.

Finally, it may be doubted whether the lesson of the importance of the typhoid carrier, so clearly and fully demonstrated in the monograph of Ledingham and Arkwright (1912), has been adequately learned. Administrative action must, of course, be limited by practical possibilities, and the detection and control of every carrier is well outside these limits. But there are certain persons—those for instance who are engaged in the processing of milk, or in the handling of foodstuffs on a major scale, or in public waterworks—whose inadvertent and unfortunate potentialities for harm are so great that it seems reasonable to suggest that employment in such positions shall be given only to those who have been adequately examined and found to be free from those intestinal infections that are readily spread by water, milk, or food.

There is little doubt that an adequate tightening of the bacteriological control of water, milk, and food throughout the country would, with no inconvenience to the public at large, and at a relatively trivial expense, reduce the incidence of enteric infection to a point at which a discussion of the rôle of antityphoid vaccination would become, at least for the stay-at-homes among us, of academic interest.

REFERENCES

Dean, A. S. (1931) *Amer. J. publ. Hlth*, **21**, 390.
Felix, A. (1935) *Lancet*, **1**, 799.
— and Pitt, R. M. (1934) *Ibid*, **2**, 186.
Friedberger, E. (1927) *Münch. med. Wschr.* **74**, 150.
Greenwood, M. (1937) *Brit. med. J.* **2**, 1197.
— and Yule, G. U. (1915) *Proc. R. Soc. Med.* **8** (Sect. Epidem.), 113.
Harvey, D. (1929) in Medical Research Council's System of Bacteriology, London, vol. iv, p. 57.
Hawn, C. B., Hopkins, J. D., and Meader, F. M. (1919) *J. Amer. med. Ass.* **72**, 402.
Ledingham, J. C. G. (1921) *Lancet*, **1**, 72.
— (1925) *J. State Med.* **34**, 1.
— and Arkwright, J. A. (1912) The Carrier Problem in Infectious Diseases, London.
Lull, G. F. (1935) *Amer. J. publ. Hlth*, **25**, 839.
Ramsey, G. H. (1934) *Ibid*, **24**, 355.
— (1935) *Amer. J. Hyg.* **21**, 664.
Stroebe, F. (1928) *Z. klin. Med.* **108**, 752.
Vaughan, V. C. (1920) *J. Amer. med. Ass.* **74**, 1075, 1145.

NORMAL VENTRICULOGRAMS IN TUMOURS OF THE CEREBRAL HEMISPHERES

By JOE PENNYBACKER, M.B. Edin., F.R.C.S. Eng.
FIRST ASSISTANT IN THE NEUROSURGICAL DEPARTMENT, LONDON HOSPITAL; AND

S. P. MEADOWS, B.Sc. Liverp., M.D., M.R.C.P. Lond.
MEDICAL FIRST ASSISTANT AND FIRST ASSISTANT, DEPARTMENT OF NEUROLOGY, LONDON HOSPITAL

THE value of ventriculography as an accessory method in the diagnosis of intracranial tumours has now become generally accepted. By means of it also much has been added to our knowledge of atrophic and degenerative processes affecting the brain, and of some sequels of head injury, notably cerebral cicatrices; in the latter group particularly, ventriculograms often reveal deforming lesions which can be dealt with surgically. The method has been no less valuable in excluding space-occupying lesions; in many suspected cases the diagnosis of tumour can be confidently dismissed on the evidence afforded by ventriculography. This applies especially to cases of headache, epilepsy, and mental changes in which the possibility of brain tumour arises.

So much has modern neurological diagnosis come to rely upon the method that we consider it of interest to record four cases of cerebral tumour in which the ventriculograms were normal, or were considered to be so by all the radiologists, neurologists, and neurosurgeons who examined them. It will be seen that in each case, ventriculography was done at a stage when the tumour had already produced well-

marked physical signs, although in two there was no papilloedema and the lumbar cerebro-spinal fluid pressure was normal.

THE CASES

CASE 1.—*Right fronto-parietal glioma (astrocytoma) with normal ventriculogram.*

L. G., a joiner aged 47, was admitted to the London Hospital on March 2nd, 1936, under the care of Dr. Russell Brain. He had been in good health until 3½ months before admission, when he began to notice a slight weakness of the left hand and foot, and shortly afterwards a feeling of numbness and coldness in those members. These symptoms had been slowly progressive until his admission to hospital. He had had no headache, visual disturbances, or epileptic attacks.

On examination he had a left hemiparesis, affecting the hand and forearm most, the lower limb to a less degree, and the lower part of the left side of the face only slightly. There was moderate wasting and flaccidity of the left forearm and hand. The tendon reflexes were slightly brisker in the left limbs than in the right, the left abdominals were diminished, but the left plantar response was flexor while the right was extensor. There was slight relative anæsthesia in the left side of the face, and impairment of postural and discriminative sensibility in the left hand and foot. No other abnormal physical signs were elicited. Both optic discs were normal, and the visual fields were full. The cerebro-spinal fluid pressure on lumbar puncture was 110 mm. The fluid contained two cells per c.mm. and 0·035 per cent. protein. Encephalography with 60 c.cm. of air outlined the ventricles fairly well. The axial views (Fig. 1) showed small symmetrically placed ventricles with no deviation of the septum pellucidum, and the lateral projections did not reveal any significant abnormality.

The patient was not severely incapacitated by the hemiparesis, and, as he improved subjectively with rest in bed, he was discharged to the out-patient department for observation. He remained well for several months, with perhaps a slight increase in the hemiparesis; he then began to suffer from headache and to have epileptic

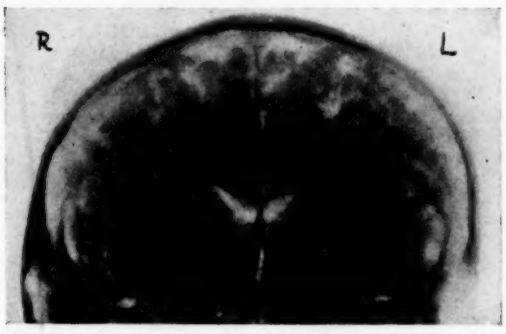


FIG. 1 (Case 1).—Anteroposterior encephalogram. Right parietofrontal tumour.

attacks. He was readmitted in November, 1936, 8 months after his first admission. The left hemiparesis was certainly more pronounced, both plantar responses were extensor, and there was impairment of all forms of sensibility down the left side of the body. In addition there was early papilloedema and complete left homonymous hemianopia. While awaiting operation he died suddenly on Nov. 24th, 1936.

Necropsy disclosed a large ill-defined infiltrating glioma involving the greater part of the right parietal lobe, extending into the right frontal and temporal lobes (Fig. 2). The septum pellucidum was slightly displaced to the left, but despite the large size of the tumour, the right lateral ventricle was not obliterated, nor even much smaller than its fellow. The tumour was an astrocytoma, in parts of which anaplastic changes were apparent.

The second case is of a similar nature, differing

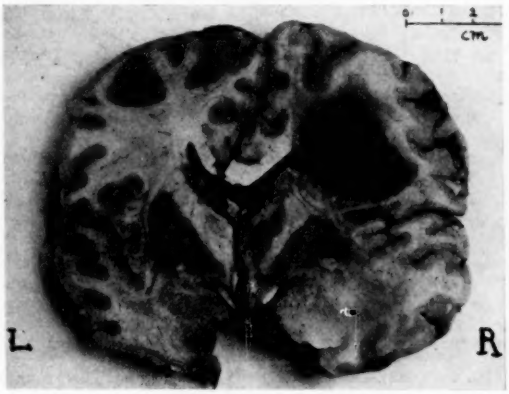


FIG. 2 (Case 1).—Coronal section of cerebral hemispheres.

however in the situation and pathology of the tumour.

CASE 2.—*Left frontal glioma (spongioblastoma multiforme) with normal ventriculogram.*

C. J., a man of 57, was admitted to the National Hospital, Queen-square, on Jan. 15th, 1934, under the care of Dr. W. J. Adie. He had been in good health until 10 months before admission when he had had a generalised epileptic seizure in which he was unconscious for about 1½ hours. This attack left no sequelæ, and he was quite well until 6 weeks later when he had a second one. Thereafter luminal seemed to control the attacks, and for 8 months he remained quite free from symptoms. In December, 1934, there were three episodes in which for several hours he was aphasic and did not have the proper use of his right arm. For some time there had been a slight failure of his memory, but otherwise his intellect was unclouded. He had not suffered from headache, vomiting, or visual disturbances.

He was a healthy looking middle-aged man, and gave a clear and intelligent account of his symptoms. No speech disturbance was apparent. Both optic fundi were normal. There was slight weakness of the lower part of the right side of the face on involuntary movement. The right side of the tongue and soft palate were slightly weaker than the left. The neurological examination otherwise was normal except for the fact that the right ankle-jerk was slightly brisker than the left, and the right plantar response was not as definitely flexor as the left. He had a high blood pressure, 220/115. Radiograms of the skull were normal. On lumbar puncture the cerebro-spinal fluid pressure was 150 mm., and the fluid contained one cell per c.mm. and 0·06 per cent. protein. The colloidal gold curve was normal, and the Wassermann reaction negative.

Shortly after admission he began to have numerous focal epileptic attacks, consisting of sudden tonic contraction of the right side of the face, starting at the angle of the mouth, with deviation of the tongue to the right. This was followed by clonic contractions of the right side of the face and of the temporal and masseter muscles. Each attack lasted about a minute, and there was no loss of consciousness, nor spread of the attack to any other part of the body. During the attack he could understand spoken and written speech, and could write but was unable to speak, probably because of the contractions of the face and tongue. When the attack ceased there was no aphasia, but there was a slight slurring of speech due to post-epileptic paralysis of the face and tongue.

On Feb. 8th Mr. Julian Taylor did a ventriculogram, which showed symmetrical disposition of normal-sized ventricles and no shift of the septum pellucidum (Fig. 3). Thereafter the attacks subsided, and as he was virtually free from symptoms he was allowed to go home for observation as an out-patient. He was next seen in July, 1935, when he was found to be very drowsy, and to

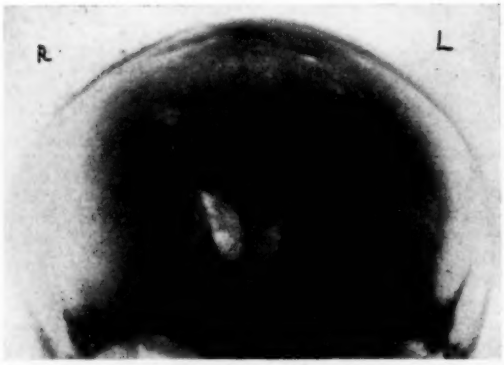


FIG. 3 (Case 2).—Anteroposterior ventriculogram. Left frontal tumour.

have bilateral papilloedema and right hemiplegia. He died on July 23rd, 1935.

At *necropsy* there was a large solid tumour measuring 5 by 5 by 2 cm. in the posterior and inferior part of the left frontal lobe, occupying the grey and white matter. It presented on the surface of the brain in the posterior part of the second and third frontal convolutions, where it was adherent to the dura over an area about 2 cm. in diameter. The bed of the tumour showed compression, suggesting that in part the tumour had pushed the cortex before it, as a meningioma does. Elsewhere the tumour appeared to be continuous with the brain, and in places to infiltrate the leptomeninges. The cut surface of the tumour showed extensive central necrosis with diffuse hæmorrhages; the more superficial parts were granular and white. There was moderate œdema of the surrounding white matter. The left ventricle was compressed and the ventricular system as a whole moderately displaced to the right side (Fig. 4).

Histologically the tumour was a spongioblastoma multiforme.

The following are brief reports of two further cases of cerebral tumour in which the axial views of the ventriculograms were normal. These cases do not provide such strong evidence of "normality" as the first two because the filling of the ventricles with air was not complete enough to outline the ventricles properly in the lateral projections.

CASE 3.—W. H., a bank clerk aged 27, was admitted to the London Hospital under the care of Dr. R. A. Rowlands on Dec. 20th, 1932. His previous health had been good, but in 1928 he had complained of vague afternoon headaches which were ascribed to eye-strain. These had ceased entirely after a few weeks and he remained well until Oct. 5th, 1932, when he woke up in the morning with a severe throbbing headache, worst in the left temple and above the left ear. He vomited several times, and from then until his admission to hospital headache and vomiting had been his only symptoms.

His intellect appeared to be normal and there was no dysarthria or aphasia. There were three dioptres of papilloedema in each eye. The neurological examination otherwise was negative. An encephalogram was done on Jan. 15th, 1933, but after 12 c.cm. of air had been injected the patient collapsed and the insufflation had to be stopped. Axial projections (Fig. 5) showed ventricles of apparently normal size, symmetrically disposed to the middle line, with no shift of the septum pellucidum. On the following day an exploratory craniotomy failed to reveal a tumour and he died four days later.

At *necropsy* a large cystic and solid tumour was found in the left frontal lobe, measuring 6·5 cm. from before backward, 4·5 cm. from side to side, and 3·8 cm. from above downward. It extended from within 0·5 cm. of the frontal pole backwards to invade the anterior horn of the left ventricle. Coronal sections of the hardened brain showed that the septum pellucidum was only slightly displaced to the right in its anterior part, the bodies of the lateral ventricles appeared to be symmetrical, and the third ventricle was small and in the middle line. Histologically the tumour was a spongioblastoma multiforme.

CASE 4.—A. M., a woman of 26, was admitted to the London Hospital under the care of Mr. Hugh Cairns on Feb. 20th, 1937. She had been in perfect health until Feb. 2nd, when she had had a generalised epileptic attack preceded by a feeling of "prickling" in the right upper limb. This attack left no sequels, but three days later she had another which left her with a severe occipital headache. The headache lasted for five days and then disappeared suddenly and completely. From that time until admission to hospital, she remained free from symptoms.

She looked healthy and said that she felt perfectly well. Both optic discs were hyperæmic, but there was no measurable swelling, hæmorrhage, or exudate. She had slight right lower facial weakness, and her tongue was protruded slightly to the right. She was not as quick and accurate in purposive tests with the right upper limb as with the left, but there was no apparent weakness or dystonia. Her right lower limb showed slight generalised weakness. The tendon reflexes were equally brisk on the two sides, but the right abdominal reflexes were absent, and the right plantar response was extensor, while the left was flexor. There was a slight defect in postural and discriminative sensibility in the right upper and lower limbs. The examination otherwise revealed no abnormality. Radiograms of the skull were normal. The cerebrospinal fluid pressure on lumbar puncture was 250 mm. and the fluid contained one cell and 0·04 per cent. protein.

Ventriculography on March 1st, 1937, one month after the onset of symptoms, showed in the axial views ventricles of normal size and symmetrical disposition (Fig. 6). The filling was not adequate to outline the ventricles satisfactorily in the lateral projections. As she was free from symptoms, and as a cortical exploration in the suspected (parietal) site would have probably given rise to a considerable sensory disability, she was discharged for

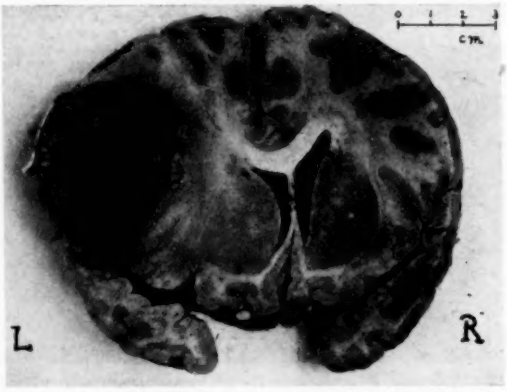


FIG. 4 (Case 2).—Coronal section of cerebral hemispheres.

observation. She was seen 3 months later, when the physical signs were only slightly more marked than at the previous examination and she had had no further attacks and felt perfectly well. A week after this interview she died suddenly in another generalised convulsion, on June 16th, 1937.

At *necropsy* there was a small cystic and solid tumour, measuring 3 by 3 by 2 cm., in the white matter of the left parietal lobe 2 cm. from the surface. There seemed to be no œdema around the tumour nor any hæmorrhage into it, and there was no obvious reason why the tumour should have produced this rapid death. Histologically it was an astrocytoma.

DISCUSSION

The interpretation of abnormal ventriculograms is often a matter of some difficulty even to the most

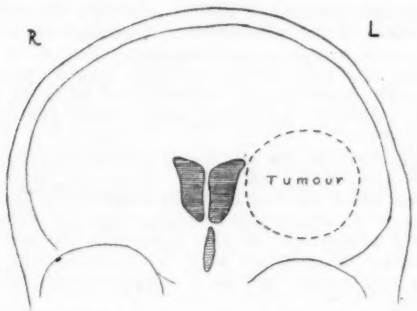


FIG. 5 (Case 3).—Tracing of encephalogram. Size and site of tumour indicated.

expert examiner. A normal ventriculogram has certain clearly defined and easily recognised features which rarely give rise to any difficulty in interpretation. Generally a good antero-posterior view gives the most information (Fig. 7A–D): (A) the bodies of the two lateral ventricles are seen in cross-section as dark triangular shadows of symmetrical size and disposition; (B) on each of these is imposed a fainter and larger shadow which represents the anterior horn of the ventricles; (C) in addition a small shadow can often be seen at some distance below and lateral to each body, representing the tip of the temporal horn; (D) the third ventricle appears as a narrow slit below and between the two lateral ventricles, exactly in the middle line. This normal antero-posterior projection is so constant that we are rarely content to explain a departure from it as an anatomical variation. To outline each part of the ventricular system satisfactorily in lateral projections it may be necessary to manipulate the head and to take views in several different positions. This is a technical

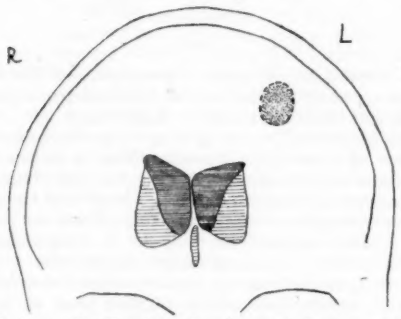


FIG. 6 (Case 4).—Tracing of anteroposterior encephalogram indicating size and site of tumour.

question which need not be discussed here, and depends entirely on physical principles governing the behaviour of two media of different density in a closed system.

Our use of the term "normal" ventriculogram with reference to the above cases thus demands some explanation. With improvement in the technique of air injection a good profile of the lateral ventricles can usually be pieced together from several lateral projections, but in the past this has not always been possible and most reliance has been placed on the axial views and especially the anteroposterior projection. And, since it is a matter of common observation that at necropsy in all hemisphere tumours there is some displacement of the septum pellucidum and some disturbance of the symmetry of the ventricles, ventriculograms which have shown no such displacement or asymmetry in the axial views have been regarded as indicating that no tumour of the hemisphere could be present. Experience of the above cases, however, shows that this opinion is no longer tenable.

In an effort to explain the absence of displacement or deformity of the ventricles in the cases described above, the first possibility which presents itself is that in each case the ventriculograms were done at a stage when the tumour was too small to be expected to produce any effect on the ventricles. In Case 1 we have no means of estimating the size of the tumour at the time of the ventriculogram, but at necropsy 5½ months later a large tumour occupying nearly half of one hemisphere had produced very little abnormality of the ventricular system. In Case 2, on the other hand, the coronal sections of the brain fixed after death showed a large tumour

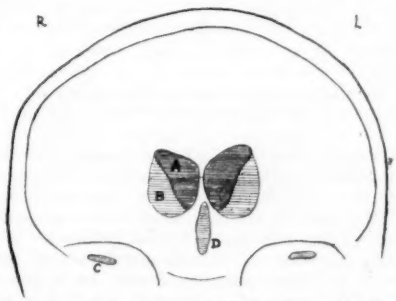


FIG. 7.—Tracing of normal encephalogram (see text).

producing a shift in the system which would undoubtedly have been apparent had another ventriculogram been done when signs of increased intracranial pressure began to manifest themselves. The tumour in this case, however, was in a most eloquent part of the cortex, and presumably declared itself, in focal epileptic discharges, before it had attained any great size, and before it had produced any ventricular displacement. In Case 3 the ventriculogram was done only five days before death and at necropsy the tumour proved to be a large one, measuring 6·5 by 4·5 by 3·8 cm. In Case 4 the ventriculogram was done four months before death, and the tumour in this case was quite small even at the time of death, measuring only 3 by 3 by 2 cm.

Thus it is seen that while the "normality" of the anteroposterior ventriculogram may sometimes be accounted for by the small size of the tumour, as in Case 4, in other cases the symmetry of the ventricular system is distorted little or not at all by quite large tumours of the hemisphere. There is a corresponding variation about the clinical picture; a small tumour may produce a great increase of intracranial pressure and gross disturbance of function, whereas a massive tumour may give rise to little increase of pressure and only minimal signs on examination.

These cases are quite exceptional since most tumours of similar size produce gross distortion of the anteroposterior ventriculograms. Even much smaller tumours may produce significant alteration of the normal appearance. Fig. 8 shows the anteroposterior ventriculogram in a case of parasagittal Rolandic meningioma that measured only 3 by 1 cm. The ventricles are seen to be displaced to the opposite

side, although the tumour was not only small but also situated on the surface of the brain at a great distance from them.

It is evident that ventricular deformity or displacement may be produced not only by the actual bulk of a tumour but also by œdema of the brain surrounding the tumour. The presence of œdema would account for the displacements which are sometimes met with in small tumours, and its absence

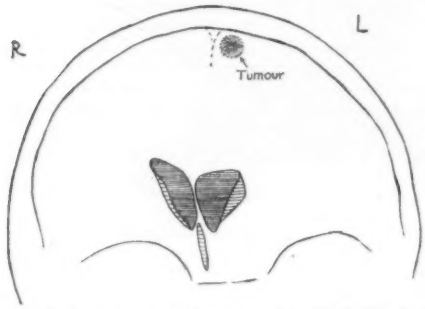


FIG. 8.—Tracing of encephalogram in a patient with a small parasagittal meningioma.

might explain the normal ventriculograms in our first two cases in which at the time of ventriculography the clinical picture was one of focal signs and symptoms with no clinical or manometric evidence of increased intracranial pressure.

Is the absence of lateral displacement of the ventricles in these cases referable to a particular pathological type of tumour? Our material is obviously too scanty for a conclusive statement, but it is interesting to note that all of our cases were invasive gliomata. Two were astrocytomata, one of these anaplastic, and two were spongioblastomata. They were tumours of varying degrees of malignancy but they differed histologically in no notable respect from other gliomata which do produce ventricular deformity.

It might have been expected that the ventricular deformity would be least with meningiomata since their growth begins so far from the ventricles, but in fact, as shown above, considerable displacement was found with a meningioma which was both smaller and farther removed from the ventricle than the gliomata in the four cases reported. It thus appears that a small tumour growing from the meninges, displacing the brain before it, is more apt to produce ventricular deformity than an invasive tumour of the same size growing in the substance of the hemisphere, and infiltrating rather than displacing the brain.

The absence of lateral displacement of the ventricular system with hemisphere gliomata does not appear to be related to any particular location of the tumour: the tumour in Case 1 was chiefly in the parietal lobe extending into the frontal and temporal lobes, in Case 2 in the fronto-temporal region, in Case 3 in the frontal lobe, and in Case 4 the parietal lobe. In each of these sites, ventriculography usually reveals a characteristic deformity or displacement.

From these observations it seems that three factors—size, site, and pathology—may occasionally operate together in such a manner that a cerebral tumour may coexist with a normal ventriculogram. A small infiltrating glioma in an eloquent site may give rise to symptoms and signs before it produces ventricular deformity, and is evidently more likely to behave in this manner than a meningioma of the same size in the same situation. But it is also evident that large diffuse gliomata may occasionally run their whole course, even to the death of their hosts, without producing any gross ventricular deformity.

This report in no way detracts from the value of ventriculography; rather, it serves to emphasise a point which modern medicine occasionally shows a tendency to disregard—namely, that an accurate clinical assessment of the patient is at least as important as accessory aids to diagnosis, and that these two factors are only complementary to one another.

SUMMARY

Four cases of cerebral tumour are reported in which the ventriculograms showed no lateral displacement of the ventricular system, or any other abnormality in the axial projections, at a time when the tumours had already produced well-marked physical signs. These tumours were all gliomata, two of them astrocytomata and two spongioblastomata. Histologically they did not differ from other gliomata which do produce ventricular deformities. Two were chiefly parietal, one frontotemporal, and one frontal in location. In each case the clinical picture was of a progressive neoplastic lesion.

We are indebted to Mr. Hugh Cairns for advice and assistance in the preparation of this paper and for access to his case records, and to the National Hospital, Queen-square for the records and radiograms of Case 2.

INDICATIONS FOR COLLAPSE THERAPY IN PULMONARY TUBERCULOSIS

By Dr. W. Behrens

DAVOS PLATZ

All treatment of open tuberculosis of the lungs aims at securing for the patient freedom from sputum containing tubercle bacilli. Experience has shown that a persistently positive sputum indicates the presence of a cavity. These cavities, a source both of sputum and hæmorrhage, play an important part in the spread of disease along the bronchial tree, and we must therefore concentrate our efforts on closing them. This can best be done by a clearly defined collapse therapy, systematically carried out.

Before I enter upon my main subject I would like to sketch briefly the effects on the lung of treatment by collapse. One important result of collapse is to give rest to the diseased lung with a decrease in its ventilation and oxygen supply. The circulatory stasis and anoxæmia thus produced in the affected part is believed by some to be detrimental to the survival of the tubercle bacillus and to check the spread of disease. Moreover, it enables the elastic recoil of the lung to come into force thereby greatly accelerating the process of healing which always accompanies shrinkage of the foci. This concentric collapse towards the hilum is of the greatest importance in the healing of cavities.

We are constantly hearing about lungs being well "compressed" by this or that method. The term used in connexion with lung tissue does not express the essential factor in collapse therapy, which is an atony of the whole diseased area achieved by the natural elasticity of the lung. Compression

by a high-pressure pneumothorax, oleothorax, or plombage is often both unsatisfactory and dangerous.

General Indications

Treatment by collapse was confined originally to unilateral tuberculosis of a mainly cavernous type. It is now recognised that purely unilateral tuberculosis is seldom met with in advanced cases, and recent work has proved that bilateral active lesions can be successfully treated by the most varied methods.

One must not, however, overlook the fact that cavernous tuberculosis of the lungs often shows a surprising tendency to spontaneous cure. The saving of time, which is nowadays very desirable in order to avoid long and costly cures, cannot be absolutely guaranteed by collapse therapy, and the possibility will always remain that some unforeseen complication of the procedure, such as empyema, may lead to a long illness which could have been avoided by patience and forethought at the outset.

Before resorting to collapse therapy careful consideration should be given to the previous course of the disease as well as to the material position and temperament of the patient. Conservative treatment should be tried first and accessory aids used only when simpler methods have failed. It is sometimes desirable to employ collapse early in order to avoid spread of infection to others, especially children.

Special Indications

Only a brief outline of special indications can be given here as clinical details can best be learnt by daily practice and accumulated experience. I shall try to convey first the essential points and to show what, in my opinion, are the indications for pneumothorax, thoracoplasty, plombage, paralysis of the diaphragm, and finally to touch upon the question of combined collapse therapy in relation to other treatment.

ARTIFICIAL PNEUMOTHORAX

Let us suppose that a patient has a cavity in the apex or a recent diffuse infiltration with a positive sputum. His general condition is good but in spite of strict conservative treatment for 2 or 3 months there is no substantial improvement and the disease shows a tendency to spread. Here, I think, one should not hesitate to recommend treatment by artificial pneumothorax in view of the activity and moderate extent of the disease; and, moreover, one can still expect to find the pleural space free from adhesions.

Cessation of activity and healing of the cavity should follow the induction of a pneumothorax. Furthermore, we can count on a satisfactory re-expansion of the lung when the pneumothorax is terminated as obstinate pleural exudates are rare with a cavity in this situation and compensatory expansion of healthy lung tissue will occur. These considerations should be modified according to whether the lesion is in the upper, middle, or lower lobe of the lung.

Let us suppose there are some adhesions. If these are cord-like or limited in extent, thereby preventing adequate collapse, they should be divided by a recognised method after which the pneumothorax can be continued in the usual way. If the adhesions cannot be divided and neither the physician nor the patient is able, for the moment, to decide upon any more drastic measures to increase the degree of collapse, it is advisable to give carefully controlled refills for a few more months, meanwhile imposing strict rest upon the patient.

It often happens, especially in recent cases where the cavity is surrounded by lung tissue capable of functioning normally, that a gradual shrinkage and cicatrisation takes place. The dangers, however, associated with an incomplete pneumothorax and a bacilli-disseminating cavity must not be ignored. It may be that later the patient will have to make up his mind to undergo a thoracoplasty and the decision will be easier for him after the failure of the routine treatment.

In chronic unilateral pulmonary tuberculosis of fibroid type with widespread damage extensive adhesions are common, and such a case is rarely suitable for pneumothorax. Nevertheless, an attempt should be made at induction as we may be agreeably surprised. Quite apart from this it is necessary to be sure that there is an adherent pleural space before deciding upon any other procedure. This investigation is particularly important when considering the advisability of a plombage.

THORACOPLASTY

If we have been compelled to admit that, owing to adhesions, a successful pneumothorax is out of the question then further treatment must be considered.

Let us suppose that a cavity at the apex has remained unaltered or even increased in size. If this is so the possibility of a rib resection arises, the extent of which will depend upon the extent of the disease; if it is confined to the apex an apical or upper lobe thoracoplasty is all that is necessary, whereas, if it extends lower Sauerbruch's paravertebral operation is the one of choice. It behoves us always to take into account the general bodily resistance of the patient. As there is rarely any urgency about thoracoplasty we have ample time to improve the general condition and to assess the operative risk.

Broadly speaking, it may be said that the subject's age should not exceed 50 years or the duration of the illness 10 years, but, of course, there are exceptions. The probability of success may be calculated from various clinical investigations which include the temperature and pulse curves, the estimation of renal function, and especially by repeated readings of the arterial and venous blood pressures. The blood picture should be investigated and a differential white cell count done, as a "shift to the left" of the polymorphs or a lymphopenia are important. These clinical and laboratory data enable us to assess the risks of an operation which have nowadays become much less owing to the adoption of a two- or three-stage procedure.

As contra-indications for thoracoplasty I have already mentioned the patient's age and the duration of the illness, each in consideration of a possible diminished cardiac reserve. Mild diabetes, intestinal and unilateral renal tuberculosis, and other extra-pulmonary foci are not absolute contra-indications but call for experienced judgment. In such cases treatment should be directed first to the intestinal lesion or a nephrectomy performed before venturing on a rib resection. It goes without saying that non-tuberculous complications affecting other organs, especially the heart or kidneys, must be given very careful consideration.

PARAFFIN PLOMBAGE

The patient with a small apical cavity with little surrounding infiltration the size of which does not justify the risks involved in a thoracoplasty is an ideal subject for an extrapleural paraffin plombage. The apex of the lung is freed, by blunt dissection with the index finger, from the inner wall of the thorax and the space so formed packed with paraffin

to prevent re-expansion. The success of the operation depends on a universally adherent pleura. The induction of a pneumothorax, therefore, should have been attempted in several places before plombage is undertaken. If, however, the cavity is large it will be wiser to perform an apical thoracoplasty as technical difficulties may prevent an adequate collapse, and the large mass of paraffin that will be required may cause trouble by acting as a foreign body.

Paraffin plombage, employed with discretion, is also useful in the treatment of small cavities situated at the apex of the lower lobe which are found posteriorly in the paravertebral region. It will be readily understood that these are difficult to treat by means of a thoracoplasty without sacrificing a large area of lung tissue that is capable of functioning normally.

The so-called *extrapleural pneumothorax* I mention only to complete the list of possible surgical interventions, as it is as yet such a newly introduced method that it is impossible at present to form a true estimate of its value.

OPERATIONS ON THE PHRENIC NERVE

When should one consider that once popular form of treatment—paralysis of the diaphragm? Fortunately the former excessive enthusiasm has somewhat cooled off during the last few years owing to many failures that have impressed doctors and patients alike, and also to the sobering effect of the increasing number of after-complications, such as dyspnœa and cardiac embarrassment.

Not only are the indications now much more limited but the technique of the operation has been modified. In the early days a phrenicotomy after the method of Stürtz—i.e., a simple division of the exposed nerve—was performed. Later, Felix and Sauerbruch suggested the operation of phrenic avulsion in which the greater part of the nerve is removed. During the last few years we have become more conservative and are usually content with either crushing or blocking the nerve trunk with alcohol, thereby producing a temporary paralysis for a few months. This is not always successful but should be done in preference to a permanent paralysis if there is any doubt about the prospects of success of the operation. The operation is used not so much for its compressive effect but rather to allow the diseased portion of the lung to follow its natural tendency to contract.

Paralysis of the diaphragm is indicated as an independent measure in lower lobe tuberculosis. Cavities in the middle zone, especially laterally, can be favourably influenced, and there are physicians who prefer in these cases phrenic avulsion to pneumothorax with its long course of treatment. One cannot deny that sometimes recent infraclavicular cavities disappear after paralysis of the diaphragm, or may be so reduced in size that they can be more easily closed by an additional operation such as a small thoracoplasty or plombage. It is also indicated when the age of the patient, disease in other organs such as the kidney, or the patient's attitude, makes a major operation impossible. To complete the list it should be mentioned that paralysis of the diaphragm has been used successfully after a thoracoplasty or a pneumothorax has failed to effect complete collapse.

BILATERAL COLLAPSE

So far I have dealt principally with unilateral pulmonary tuberculosis. What treatment should be adopted when there is disease in both lungs and a long conservative "cure" has been unsatisfactory? All I can say definitely is that we have to arm ourselves with untiring patience and often to be content with only a partial restoration of the patient's capacity for work.

Clear indications for collapse treatment are found in only a limited number of cases. The problem is still in a state of flux and has to be solved differently according to the experience and capabilities of the individual doctors concerned.

A few interesting facts may, however, be mentioned. For instance, we sometimes find in a patient whose general condition is good that after a successful collapse has been established on the most advanced side, there is a remarkable and unexpected improvement in the activity of the other side, which may even amount to a complete cure. There have been cases where a bilateral pneumothorax, previously considered necessary, was rendered superfluous by the success of the first pneumothorax performed on the most affected side; improvement in the collapsed lung is accompanied by a disappearance of cavities on the opposite side although they had previously resisted a strict rest cure of many months. Again, small apical cavities on the relatively sound side are not an absolute contra-indication for a thoracoplasty on the opposite side, for it has been noticed that such cavities may heal completely when this treatment is successfully undertaken. For these reasons alone caution is advisable, and its necessity is still more impressed upon us when we consider the possible sequelæ of an over-enthusiastic intervention on both lungs.

The clearest indication for a double pneumothorax is recent bilateral cavernous tuberculosis of moderate extent. Even so, it is wise first of all to treat the side on which the disease is more advanced and to establish a satisfactory condition there before undertaking the pneumothorax on the other side. When once the disease is advanced adhesions have naturally to be reckoned with and they can be a serious complication. In a febrile patient with extensive tuberculosis there are likely to be foci under the pleura which may lead to exudation and other complications such as perforation and empyema.

There is another point that deserves attention. Occasionally a patient with an established pneumothorax on one side develops a fresh outburst of activity in the good lung which, despite conservative treatment, progresses to cavity formation. In such a case, so long as the fresh lesion is limited in extent, there should be no hesitation in establishing a second pneumothorax.

When there are massive adhesions obliterating the pleural cavity a few selected cases can be successfully treated by a double plombage or apical thoracoplasty. Such an operation on one side does not preclude the possibility of treatment by pneumothorax or an apical plombage on the opposite side.

I am purposely abstaining from giving any further particulars owing to the lack of sufficient statistics of permanent cures which, after all, are the only criteria in judging the success of these risky and severe measures.

Conclusions

In reviewing the present-day indications for collapse therapy it must be admitted that they have been considerably extended in the last ten years. I doubt, however, whether the high hopes held out have been justified by later results. The more cases one observes and the more one is able to keep in touch with former patients the more one feels obliged to be cautious in expressing an opinion. By saying

that, I do not mean in the least to deny the many fine results obtained.

The management of an apparently straightforward ambulatory pneumothorax is not so simple as it is said to be and, above all, requires considerably more individual treatment than is generally supposed. A successful operation does not justify us in regarding the tuberculosis as having been overcome, for relapses speak only too clearly to the contrary.

Conservative treatment, especially a strict rest-cure, continues to be the foundation of all treatment of tuberculosis. This, I think, is the conclusion reached by every unprejudiced physician if he carefully examines the results obtained in his own experience.

I am much indebted to Dr. N. L. Rusby for his help in the arrangement and phrasing of this paper.

SERUM REACTIONS AFTER INJECTION OF CONCENTRATED THERAPEUTIC SERUM

By Hilda M. Davis, M.D. Liverp., D.P.H.
ASSISTANT MEDICAL OFFICER IN THE ROYAL BOROUGH OF KENSINGTON

In recent years the practice of concentrating therapeutic sera has been generally adopted. The consequent reduction in bulk and amount of protein injected has resulted in a lower incidence of reactions attributable to the presence of foreign protein.

Table I shows a comparison of the incidence of the main signs of serum reaction after injection with whole and concentrated diphtheria antitoxic serum.

TABLE I—INCIDENCE OF REACTION WITH CONCENTRATED ANTIDIPHTHERITIC SERUM

Author.	Type of serum.	No. of cases in series.	Percentage incidence in cases treated.		
			Rash.	Joint pains.	Œdema.
Goodall (1928)	Whole.	8726	40·1	4·3	—
Rolleston (1929)	"	1472	66·4	9·3	—
M.A.B. report (1928–29)	"	711	44·3	4·19*	1·25
	Concentrated.	323	15·7	0·41*	0·3
Hunt (1932)	"	2859	28·1	—	—
Present investigation	"	4835	17·3	0·33	0·35

* Figures taken from a comparable series.

Since the incidence of serum reactions is still quoted from figures for unconcentrated serum, it might be of interest to study a series of cases given the concentrated serum now in use. These were found in a series of 4835 consecutive (non-fatal) cases of diphtheria treated at the North-Western (L.C.C.) Hospital during the five-year period 1929–33 with concentrated and refined serum as prepared for the Council's hospitals at their antitoxin establishment (Belmont Laboratories).

INCIDENCE AND MANIFESTATIONS

For the purpose of this analysis serum reaction is interpreted as including any reaction that may be attributed to the injected serum, apart from the immediate thermal reaction of intravenous therapy.

Serum reactions are divided into:

General reaction.—Results of reaction due to circulating serum, including rashes occurring apart from the site of injection and signs such as fever, œdema, and arthritis which may occur in the absence of a rash.

Local reaction, where the rash is limited to the site of serum injection.

Albuminuria, which is accepted as a sign of serum reaction when appearing during the potential period of reaction to serum injection and in the absence of other causes.

The following is an analysis of the cases:—

Total of cases		4835
Total cases showing serum reaction		1061
Percentage of serum reaction		21·9
" general reaction	(845)	17·5
" local reaction only	(142)	2·9
" albuminuria only	(74)	1·5

ASSOCIATED FACTORS

Age and sex.—Serum reactions occurred with greatest frequency in the 0–5 year age-group. There was no difference in sex incidence (males 17·1 per cent., females 17·8 per cent. in this series).

Dose.—The amount of serum injected had a noticeable influence on the incidence of serum reaction, high dosage being accompanied by an increase as illustrated by Table II.

TABLE II—PERCENTAGE OF SERUM REACTIONS IN 4835 CASES

Age-groups in years.	Dose of serum.		
	Under 8000 units.	8–24,000 units.	Over 24,000 units.
	%	%	%
0– 5	6·8	38·4	43·1
5–10	4·3	28·7	28·5
10–15	4·8	29·4	46·1
Over 15	3·3	28·6	31·4
Total	5·1	31·7	36·0

Note.—Figures refer only to those cases showing evidence of general reaction.

Previous serum injection was also an important factor in determining the occurrence of serum reaction. Thus of 4662 patients with no history of previous serum injection 16·4 per cent. developed general serum reaction, whereas of 173 patients who had received previous serum 47·4 per cent. showed reaction, a threefold increase. Of the cases receiving reinjection of 24,000 units or more, no fewer than 66·7 per cent. developed reaction.

Route.—The effect of intravenous therapy was not so great, an increase of only 4 per cent. being noted where part of the dosage of 24,000 and more was given by this route compared with the similar group treated by the intramuscular route only.

Variation in serum.—The percentage of reaction in each of the five-yearly periods ranged from 14·1 to 21·8. Since this difference did not depend on the number of cases reinjected with serum or receiving high dosage, it is concluded that batches of serum vary in power to produce reaction.

Asthma in the history was not a factor in producing serum reaction in this series. It was recorded in 15 cases (no type specified), two of which developed general reaction—a rate of 13·3 per cent. Two other cases showed local serum reaction only.

GENERAL REACTIONS

There were altogether 845 general serum reactions in the series.

Incubation period.—The average day of occurrence of the reaction was the eighth after injection, the greatest number of cases showing an incubation

period of 8–10 days (span 1–52 days), the day of injection being counted as the first. Previous serum injection shortened the incubation period in the majority of cases, reducing the average day of occurrence to the sixth.

TABLE III—INCUBATION PERIOD

Incubation period (days).	Number of cases.		
	No previous serum.	Previous serum.	Total.
1– 3	22	16	38
4– 6	104	47	151
7–10	428	18	446
11–14	157	—	157
15–21	45	—	45
22–30	5	—	5
32	1	—	1
39	1	—	1
52	—	1	1
Total	763	82	845

TABLE IV—DATE OF REACTION

Type of cases.	Day with most reactions.	3-day group with most reactions.	Length of incubation period.		
			Under 7 days.	7–14 days.	Over 14 days.
			%	%	%
No previous serum ..	8th	8–10th	16·5	76·7	6·8
Previous serum ..	6th	5–7th	76·8	22·0	1·2
Combined total ..	8th	8–10th	22·4	71·3	6·3

As originally defined by von Pirquet and Schick (1905), an immediate serum reaction is one occurring within 24 hours of injection, and an accelerated reaction appears from the second to sixth day. After first injections of serum 1·05 per cent. of cases showed immediate reaction and 15·5 per cent. reaction of the accelerated type. When serum was reinjected, after an interval of more than 10 to 14 days an incidence of 7·3 per cent. immediate and 69 per cent. accelerated reactions occurred. Few cases have been recorded that present signs of serum reaction after an interval of longer than four weeks. There were 3 of these in this series, diagnosed in the absence of other known cause. The first developed general urticaria, accompanied by fever and œdema of the face, on the 32nd day after serum injection. In two other cases urticaria of a mixed type appeared on the 39th and 52nd days subsequent to injection of serum.

Duration.—In over 80 per cent. of cases serum reaction was completed within 48 hours; but in a few instances it was prolonged, the maximum duration being 9 days. Previous serum injection tended to shorten the period of reaction.

RASHES

Three main types of rash occur in serum reactions—urticaria, erythematous (including scarlatiniform), and morbilliform. In this series rashes have been subdivided into five groups and Table V shows their relative frequency and difference in incubation period. Urticaria was by far the most often met (80·1 per cent. of total rashes). Circinate rashes tended to appear late and the polymorphous type in less than 10 days, but no one type was limited to a particular period of incubation.

TABLE V—ANALYSIS OF 861 RASHES OCCURRING IN 837 CASES

Rashes.	Incubation period in days.			
Type.	—	1–6	7–12	Over 12
	Per cent.			
Urticaria	80·1	13·5	73·0	13·5
Circinate urticaria	0·6	—	20·0	80·0
Scarlatiniform and unclassified erythema	9·5	12·2	72·0	15·8
Morbilliform	8·1	11·8	69·6	18·6
Polymorphous	1·2	30·0	70·0	—

Recurrent rashes developed in 2·4 per cent. of general serum reactions. They appeared with greater frequency in females of the younger age-groups and in cases that had received previous serum injection. In 19 cases in this series two, and in one case three, separate reactions were noted, and 3 additional cases developed two distinct types of rash simultaneously. The incidence of recurrent rashes was not confined to any particular batches of serum, being scattered throughout the series, and was evidently due to individual idiosyncrasy in the patient.

OTHER REACTIONS

Œdema of the face and hands was recorded in 2 per cent. of general reactions, was twice as common in males as in females, and tended to occur in the lower age-groups and in reinjected cases. High dosage and intravenous therapy were not factors in its causation.

Arthritis or joint-pains occurred in 1·9 per cent. of general reactions, 50 per cent. of cases being adult and all female in this series. It was also more prevalent in reinjected cases.

Arthritis or œdema may develop as the result of serum injection without an accompanying rash (0·95 per cent. of reacting cases).

Fever.—3·4 per cent. of general reactions developed pyrexia of a mild degree (up to 102° F.). This sign appeared most frequently in females of the younger age-groups, previous serum injection having no effect upon its incidence.

Adenitis is rare and was only noted in 0·2 per cent. of this series. The two cases were treated with the same batch of serum.

Neurological complications.—No case was recorded in this series.

Local serum rash limited to the site of injection may be the only evidence of reaction to the foreign protein, or it may precede or accompany a generalised rash, which it tends to resemble in type.

Albuminuria, which may be accepted as a serum phenomenon, occurred in 2·8 per cent. of all cases treated with diphtheria antitoxic serum and was present in 13 per cent. of all cases of reaction. It appeared most often 6–12 days after serum injection and in the majority lasted less than six days.

Thermal reactions directly after intravenous injection cannot be regarded as serum reactions and have no relation to the rare acute reactions, accompanied by dyspnœa, that occur in horse-allergic individuals and are similar in mechanism to anaphylaxis in animals. Reactions of this type have been recorded after many types of intravenous injection and are due to shock following the introduction of a foreign substance into the circulation.

In this series 6 of the 145 cases treated by intravenous therapy (4·2 per cent.) were recorded as developing immediate rigors, accompanied by slight pyrexia and occasional cyanosis but no dyspnœa. In each instance the serum dosage was above 24,000 units, and 5 of the 6 cases later developed general serum reaction. None had received previous serum injection or gave any history of allergy. Mild degrees of chill were of more frequent occurrence.

"*Serum accidents.*"—The occasional severe and rarely fatal reaction seen in allergic individuals subsequent to serum injection did not occur in this series, although 3·6 per cent. of the cases had received previous serum injection and 0·31 per cent. gave a history of asthma.

SUMMARY

An analysis is presented of the incidence and manifestations of serum reaction occurring in a series of 4835 cases treated with concentrated diphtheria antitoxic serum.

General serum reaction developed in 17·5 per cent. of all cases treated, and if local reaction and albuminuria are included the figure was raised to 21·9 per cent.

The main factors responsible for increasing the incidence of serum reactions are high dosage, necessitating the introduction of greater amounts of foreign protein, sensitivity to serum due to previous injection of serum, and the variation in power of different batches of serum to produce reaction.

An account is given of the incubation period, duration, and manifestation of 845 general reactions that occurred in this series. The most frequent day of occurrence was the eighth after injection, but in reinjected cases this was reduced to the sixth. In over 80 per cent. of cases the reaction was mild, being completed within 48 hours.

Five types of rash are recorded, 80·1 per cent. of the total rashes being urticarial and 9·5 per cent. erythematous and scarlatiniform. Recurrent rashes occurred in 2·4 per cent. of general reactions. Œdema of face and hands developed in 2 per cent., joint-pains in 1·9 per cent., and mild pyrexia in 3·4 per cent. of general reactions.

Albuminuria, which may be accepted as a serum phenomenon, occurred in 2·8 per cent. of all treated cases and was present in 13 per cent. of serum reactions.

Immediate thermal reactions following intravenous injection were not regarded as serum reactions.

No case of severe or fatal reaction to serum injection occurred in this series.

CONCLUSION

Concentrated horse-serum used for the treatment of diphtheria rarely causes any anxiety from possible serious developments, though it may be responsible for some days of discomfort to the patient.

I am much indebted to Dr. A. Joe, formerly medical superintendent of the North-Western Hospital, L.C.C., for allowing me access to the case records while I was a member of his staff and for permission to publish this analysis, which is compiled mainly from his personal observations. Also to Dr. J. A. H. Brincker, chief medical officer, L.C.C., and Dr. R. G. White, of the Belmont Laboratories, for their kindly criticism of this paper.

REFERENCES

Goodall, E. W. (1928) A Textbook of Infectious Diseases, London.

Hunt, L. W. (1932) *J. Amer. med. Ass.* **99**, 909.

Rep. Met. Asylums Bd. (1928) The Relative Value of Concentrated and Unconc. Diph. Antitoxin.

Rolleston, J. D. (1929) Acute Infectious Diseases, London.

von Pirquet, C. E., and Schick, B. (1905) Die Serumkrankheit, Leipzig.

PREPARATION 2020

A NEW BLOOD-PRESSURE RAISING DRUG*

By F. Avery Jones, M.D., M.R.C.P. Lond.

ACTING FIRST ASSISTANT, MEDICAL PROFESSORIAL UNIT, ST. BARTHOLOMEW'S HOSPITAL, LONDON

With observations on its use in Asthma

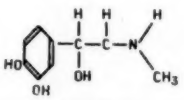
By Clifford Wilson, D.M. Oxon.

ASSISTANT IN THE MEDICAL UNIT, LONDON HOSPITAL

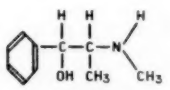
An important phase in modern therapeutics has been the introduction of drugs chemically related to adrenaline and acetylcholine, and there are already many variations on these two themes. A striking feature of these new drugs is the way in which they reproduce mainly one action of their parent substance. Carbaminoylcholine (Doryl) acts powerfully on the bladder and is used for the treatment of post-operative retention of urine. Acetyl β-methylcholine (Mecholin) with its chief action on the heart, finds its application in paroxysmal tachycardia. Benzedrine, too, with its remarkable cerebral effects, is another example of this new group.

The preparation 2020 (Ciba Ltd.), a sympathomimetic drug, is a distant relation of adrenaline. Its chemical name is trimethoxybenzyl-dihydroimidoazol hydrochloride (Fig. 1). In laboratory animals it was found to produce prolonged elevation of the blood pressure. In man it appears to act predominantly on the smooth muscle of the blood-vessels and skin, producing a rise in blood pressure, pallor, and goose-skin.

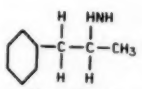
FIG. 1



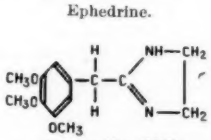
Adrenaline.



Ephedrine.



Benzedrine.



Preparation 2020.

Clinical trial has demonstrated its pressor effect. After injection there is a sharp rise in the blood pressure, and then a gradual fall to the original level. There is also slowing of the pulse, which may outlast the corresponding rise in blood pressure. With 0·1 gramme intravenously (Fig. 2) there is a rise of 30–80 mm. Hg, the total effect lasting about thirty minutes. There is considerable variation in the degree of response of individuals, and even on different occasions with the same patient. This is, however, a feature of drugs which reproduce the action of the autonomic nervous sytem. Inconstant response has been obtained with the same dose intramuscularly, but with doses of 0·2 and 0·3 g. there is a greater and more prolonged effect (Fig. 3). The preparation is also active when given by mouth.

The slowing of the pulse is prevented or abolished by atropine, without loss of the pressor effect (Fig. 4). Electrocardiograms taken after intravenous injection in six patients show that the slowing was a sinus bradycardia. That it is possible to

* A report to the Therapeutic Trials Committee of the Medical Research Council.

produce heart-block, however, was demonstrated in one patient with rheumatic carditis. Her electrocardiogram showed prolongation of the P–R interval with dropped beats. It should be mentioned that a pulse-rate, between 40 and 50 may be found soon after the injection. So far there has been no cause for anxiety on this account, but in view of the heart-block on the one occasion, we would suggest an intravenous injection of atropine 1/75 grain should there be undue slowing of the pulse. This, it is emphasised, does not abolish the pressor effect; indeed, it appears slightly to increase it.

Immediately after injection the patient complains of coldness down the back of the neck and spine, which quickly spreads over the trunk and limbs. There is a sensation of tightness across the forehead and on the vertex. These sensations appear to be the result of the contraction of the smooth muscle in the skin; gooseskin is nearly always seen. This is probably largely due to direct action on the erector pilæ muscles, for it is seen locally around a small subcutaneous injection. Usually the skin appears pale, but a transient patchy erythema was seen round the neck and trunk in a few patients. When the drug is given by mouth or by intramuscular injection the reactions are uncomfortable but seldom really unpleasant. When it is given intravenously, however, there may be unpleasant palpitations and throbbing of the head. Respirations may be increased for a short time. Some patients experience a desire to micturate, but are unable to do so. No cerebral effects have been observed in any of our patients. In four cases the blood-sugar was estimated and showed no increase, as after injection of adrenaline. Gastric peristalsis was seen to be inhibited for 15–20 minutes, when the drug was injected into patients having barium X ray examinations.

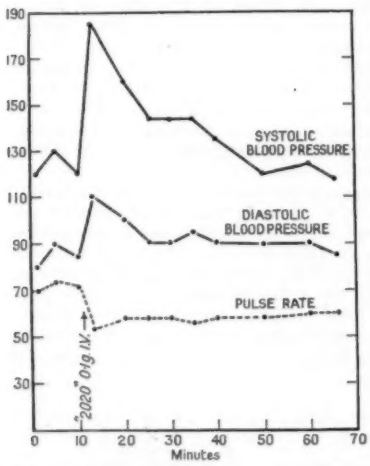


FIG. 2.—Effect of intravenous injection of 2020 (0·1 g.). (Man, aged 40, with gastric ulcer.)

Cautious and extensive clinical trial has established the safety of this drug in the prescribed doses. In 1 patient only, out of a total of about 150, were toxic effects observed, an urticarial eruption developing about half an hour after the injection.

The maximum dosage used so far has been: intravenously 0·2 gramme; intramuscularly 0·3 g.; by mouth 1·0 g. The recommended dose is intravenously 0·1 g., intramuscularly 0·2 g.

CLINICAL APPLICATION

Spinal anæsthesia.—It is well known that the blood pressure may fall considerably during spinal anæsthesia, even after the customary injection of 0·1 g. of ephedrine intramuscularly. Such cases may cause much anxiety, as the blood pressure usually fails to respond to further injections of ephedrine. Preparation 2020, 0·1 g. intravenously, will cause a sharp rise of the blood pressure and a slowing of the pulse-rate. This has been demonstrated in 9 cases, 2 of which are illustrated in Figs. 5 and 6. The first patient was a woman aged 50, who was having a cholecystectomy and the injection was given because the systolic blood pressure had fallen to 90 mm. Hg and showed no signs of rising. The immediate response of the blood pressure and improvement in the pulse relieved the anæsthetist of his anxiety. The readings in Fig. 6 are from a woman aged 40 with Raynaud's disease who was having skin-temperature tests after spinal anæsthesia. A comparison between ephedrine and 2020 is possible in this case.

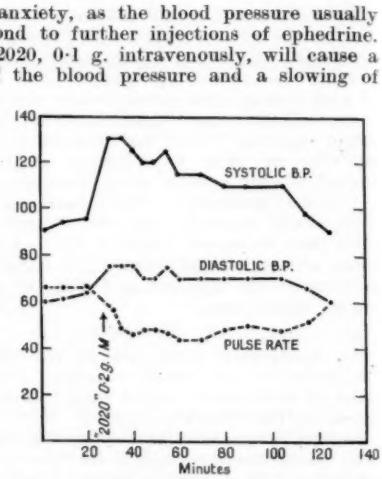


FIG. 3.—Intramuscular injection of 2020 (0·2 g.) showing more prolonged effect. (Man with duodenal ulcer.)

At present, the best dose to give simultaneously with spinal anæsthesia is still uncertain. In earlier cases, which received 0·15 g. intramuscularly, the blood pressure was not satisfactorily controlled. With 0·2 g. the results have been much better, but it is possible that larger doses may be necessary. Mr. Frankis Evans has kindly used this preparation in 25 cases of spinal anæsthesia. The results in larger series will be reported in due course, but this preparation appears to be superior to ephedrine when given after the blood pressure has fallen. While not conclusive, our recent graphs suggest that its action may also be more satisfactory than that of ephedrine when given at the time of the anæsthetic.

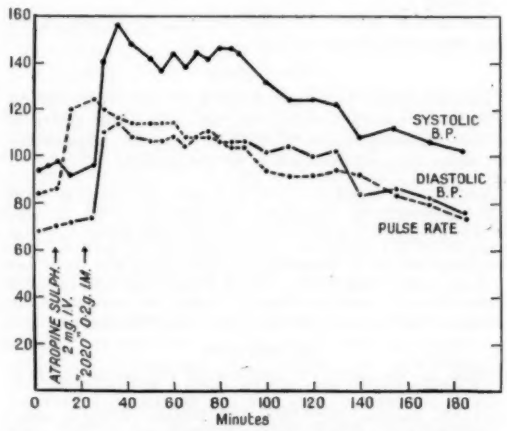


FIG. 4.—Effect of intravenous injection of atropine (2 mg.) before intramuscular injection of 2020 (0·2 g.). (Woman with duodenal ulcer.)

Treatment of shock.—Operative shock is a dreaded complication of surgical intervention. Preparation 2020 has been used with admirable results in 5 cases, 3 of which, however, received Coramine at the same time.

CASE 1.—A man of 60, with a perforated gastric ulcer, became almost pulseless and moribund. He responded immediately to an injection of 0·1 g. of 2020 only, intravenously. His blood pressure rose to 130 and the pulse-rate fell to 60 and became full and bounding. The operation was completed.

CASE 2.—A man aged 75, during a colostomy performed under spinal anæsthesia for intestinal obstruction due to carcinoma of the colon, became pale and collapsed, twenty minutes after the beginning of the operation. 0·1 g. of 2020 was given intramuscularly and eight minutes later his blood pressure had risen from 115/40 to 170/60 and his pulse-rate had fallen from 116 to 108. The operation was completed satisfactorily.

CASE 3.—A man of 65, with an appendix abscess and general peritonitis, collapsed during operation under spinal anæsthesia. 8 c.cm. of coramine and 0·2 g. of 2020 were injected intravenously. The patient responded dramatically; his pulse became firm and slow and the operation was completed without further anxiety.

Four other cases of operative shock which were given 0·05 or 0·1 g. intramuscularly showed little

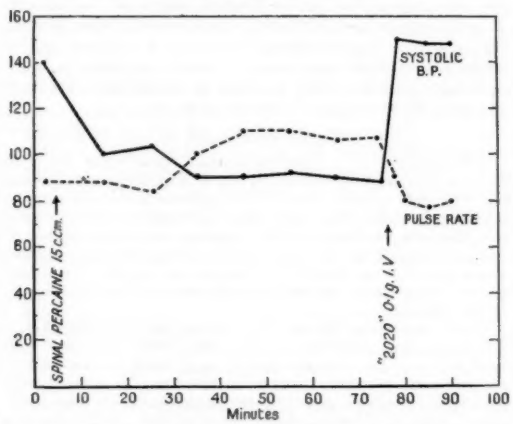


FIG. 5.—Effect of 2020 (0·1 g. intravenously) during spinal anæsthesia (see text).

or no response. It appears to be of most value given intravenously. If necessary the injection could be repeated.

This preparation was also used in one case of collapse after post-partum hæmorrhage and manual removal of the placenta; 0·05 g. was injected intravenously, but was without effect.

Treatment of bronchial asthma.—2020 was administered by one of us (C. W.) to 16 patients, 6 of whom were in-patients. It is obviously more satisfactory to make direct observations on patients in hospital, but almost always the severity of the attacks appeared to diminish spontaneously after admission to hospital. It was decided, therefore, to administer 2020 by mouth to patients attending the out-patient clinic and to compare the subjective improvement produced by the drug with that produced by ephedrine over a given period of time. The following abstract illustrates the results of this procedure in a typical case.

A. B., a woman of 24, had a fifteen years' history of asthma. During the last six months the attacks had increased in

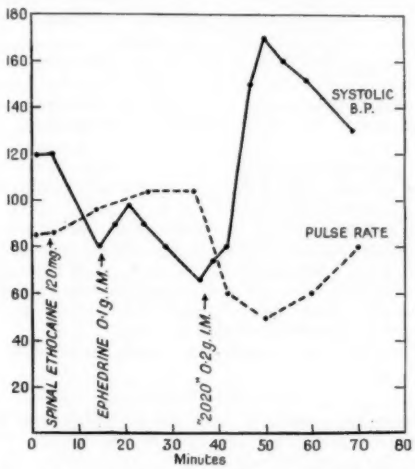


FIG. 6.—Effect of 2020 (0·2 g. intramuscularly) during spinal anæsthesia (see text).

frequency and severity, occurring practically every night and occasionally during the day. They lasted between one and twelve hours. Apart from signs of emphysema physical examination was negative. Radiography of the chest and sputum examination were also negative.

Ephedrine ½ grain twice daily by mouth was administered with good relief of symptoms. The attacks diminished in frequency to once or twice weekly and were less severe, lasting not more than two or three hours. After several weeks' treatment, however, ephedrine became less effective and after six weeks the attacks recurred nightly, and ephedrine was without effect. 2020 in 0·1 g. doses was now given twice daily and the attacks diminished in frequency and intensity, severe attacks occurring only about once a week. One 0·1 g. tablet of the drug, at the onset of an attack, would always prevent its development, but was useless once the attack was fully developed. The only untoward effect observed was the occurrence of goose-flesh about an hour after taking the drug and this might persist half to two hours. This patient continued to obtain relief from 2020 for thirteen weeks, after which she contracted a cold in the head and severe attacks of asthma recurred nightly for ten days. During this time she obtained relief from neither ephedrine nor 2020. The condition improved spontaneously and subsequently she obtained relief from ephedrine in half-grain doses, whilst 2020 (0·1 g.) appeared to be valueless.

Of the 16 cases of bronchial asthma treated with 2020, 10 were in some measure relieved. Of these 10, 1 did not respond to ephedrine and in 1 ephedrine, though effective at first, subsequently failed to relieve the attacks. A third patient could not tolerate ephedrine on account of palpitations, but responded to 2020 without any severe symptoms being produced. In one case after thirteen weeks, and in a second after three weeks' administration, a tolerance to 2020 was developed. Almost all patients complained of cold shivers or goose-flesh shortly after taking 2020 by mouth, the duration of this symptom being from half to three hours. Two patients complained of fullness of the head and dizziness and because of these symptoms preferred ephedrine to 2020. No other untoward reactions were observed after oral administration of the drug, the maximum period of administration being sixteen weeks.

In a smaller series of 8 cases (F. A. J.) where asthmatic attacks were controlled by ephedrine, 2020, although giving slight symptomatic relief, was stated by the patients to be inferior to ephedrine.

Intravenous injections of 0·1 g. were given to two patients during acute attacks, without benefit, although adrenaline was successful.

In renal colic 2020 was tried in 10 cases in view of its action on smooth muscle, but the relief has been too inconstant for its use to be recommended. No action would be expected from a sympathomimetic drug.

In paroxysmal tachycardia it was unsuccessful in one patient, who was given an intravenous injection of 0·1 g. during an attack.

In neurocirculatory asthenia the pulse-rate was maintained, in one case at a slightly lower rate, with 2020, 0·2 g. two-hourly by mouth, with the patient at rest in bed, but the continuous sensation of coldness of the skin made its use unpleasant for the patient. There was no clinical benefit.

In peptic ulcer and colon spasm 2020 does not relieve pain.

SUMMARY

Preparation 2020, a new sympathomimetic drug, raises the blood pressure and slows the pulse.

In therapeutic doses it has little action on the smooth muscle of the alimentary or urogenital tracts.

Its action on the bronchial musculature renders it of some value in asthma, but it appears to be inferior to ephedrine. It may be useful as an alternative drug when ephedrine is contra-indicated or inactive.

It has been found helpful in controlling the blood pressure during spinal anæsthesia and in the treatment of operative shock.

Thanks are due to Prof. L. J. Witts and Prof. Arthur Ellis for help and advice, to Mr. Frankis Evans for his kind coöperation, and to Dr. F. H. Yates and Dr. A. N. Duggal for help in the preliminary investigations.

NATURE OF THE SUBCUTANEOUS SPHERULES IN SOME CASES OF THE EHLERS-DANLOS SYNDROME

By F. Parkes Weber, M.D. Camb., F.R.C.P. Lond.
PHYSICIAN TO THE GERMAN HOSPITAL, LONDON; AND
Janet K. Aitken, M.D. Lond.
PHYSICIAN TO THE ELIZABETH GARRETT ANDERSON HOSPITAL AND THE PRINCESS LOUISE HOSPITAL FOR CHILDREN, LONDON

In a recent paper on the Ehlers-Danlos syndrome one of us described the condition as representing an "idiopathic" abnormality of development, manifested by certain main constituent features or signs, not all of which need be present in the same case (Weber 1936). In incomplete forms of the syndrome only one or two of the main signs need be present, for instance, only the friability of the skin and its blood-vessels. The signs are as follows:—

(1) Looseness or over-elasticity of the skin—cutis laxa or cutis hyperelastica. This may be limited to certain portions of the skin, for instance, especially over the convexity of the knees and elbows.

(2) Looseness or over-extensibility of joints, especially the joints of the thumbs and fingers.

(3) Friability of the skin and its blood-vessels. In most cases this is the chief and most obvious sign, as Ronchese (1936) has pointed out. A slight knock, especially where the skin lies directly over bone, may produce a hæmatoma or actual splitting of the skin. Such wounds tend to gape and give rise to characteristic broad "cigarette paper" or "papyraceous" atrophic scars, the presence of many of which, especially over the knees and elbows, is almost pathognomonic. It should not be confused with the scars of the dystrophic type of epidermolysis bullosa, in which sanguineous bullæ occur, but not the hæmatomata and contusional gaping wounds characteristic of the Ehlers-Danlos syndrome.

(4) In the above-described atrophic scars "pseudo-tumours" of loose connective tissue occasionally develop, which have been said to constitute a fourth clinical manifestation of the Ehlers-Danlos syndrome.

(5) In several cases, notably in some observed in England, the presence of peculiar freely movable nodules in the subcutaneous tissue of certain regions has been observed. These nodules or "spherules" are usually pea-sized or smaller, and slip about under the skin, apparently in the superficial portion of the subcutaneous fat. By light pressure with the finger they can easily be moved an inch or considerably more without any pain or tenderness being complained of. Owing to their hardness one would not expect them to be lipomata, but by microscopic examination they have been found to consist of fat, and Tobias (1934) referred to them as multiple subcutaneous lipomata. We think (see further on) that they are sprouting (bud-like) lobules of subcutaneous fat, which by gradual thinning and atrophy of their pedicles become more or less free bodies in the loose subcutaneous tissue. They apparently were present in four out of the seven English cases of the Ehlers-Danlos syndrome referred to by Parkes Weber (1936), though the microscopical reports were not all in accordance with our view. Their presence in considerable number may be said to constitute the most remarkable feature of the present case.

PRESENT CASE

The patient is a married woman, now aged 34, 1·65 metres in height and 73 kg. (11½ st.) in weight. She has enjoyed fair health, except for various aches and pains, especially in the feet, and some attacks of biliary colic, the first attack having been during her first pregnancy. Since the birth of her last child (fourth pregnancy), five years ago, she has tended to increase in weight, but under recent temporary dietetic restrictions she became somewhat thinner.

There can be no doubt that she is an example of the Ehlers-Danlos syndrome. The cutis laxa is fairly well marked over the elbows, knees, and back of the hands. In some other parts, notably in the loins, a considerable development of subcutaneous fat has given rise to waterbed-like "cushions," which were more striking some months ago when she was fatter. Over-extensibility of joints is shown mainly in the fingers, particularly at the proximal interphalangeal joints. The friability of the skin and its blood-vessels is less marked than in most typical cases, but there are a few characteristic "atrophic" scars over the elbows (dating from childhood) and she "bruises easily." The application of the capillary resistance (Rumpel-Leede) test leads to a slight cutaneous ecchymosis. The "atrophic" scars over the elbows have not been associated with the formation of connective tissue "pseudo-tumours," as in some cases.

The most remarkable feature of the case is, however, as already mentioned, the presence of a considerable number of freely movable subcutaneous spherules, which can be easily shifted for an inch or considerably more in any direction under the skin. They are mostly less than pea-sized and feel hard and are not associated with any pain or tenderness. Most of them are on the forearms and back of the hands, but some minute ones (strikingly hard to the touch) are located about the right patella. A biopsy on one of them from the back of the left hand showed it to consist of ordinary fat vesicles enclosed in a fibrous capsule. Macroscopically, when excised, it seemed a little less translucent than the surrounding fat, from which it was almost entirely disconnected.

Other data.—Nothing special by ordinary examination of the heart, lungs, liver, and spleen. The urine contained a slight "cloud" of albumin and a few leucocytes. Brachial

blood pressure: 110/85 mm. Hg. Blood count: hæmoglobin, 102 per cent.; erythrocytes, 5,300,000; leucocytes, 7200 (eosinophils 3 per cent., polymorphonuclear leucocytes 42 per cent., lymphocytes 46 per cent., monocytes 9 per cent). Thrombocytes: 260,000 per c.mm. of blood. Nothing abnormal was found in regard to the blood coagulation time, the erythrocyte-sedimentation rate, the blood calcium, the blood-sugar curve, and the radiogram of the pituitary fossa.

REMARKS IN CONCLUSION

It seems that the presence of freely movable subcutaneous spherules, in considerable numbers, especially in regions where the skin is loose (cutis laxa), may be included as a fifth main sign of the Ehlers-Danlos syndrome, though it has not been recorded in most cases. Further observations are necessary to show in what proportion of cases this sign is present. The spherules are apparently not true lipomata, but result from a deviation in the normal type of fat growth—namely, from the arborescent (bud-like) development of small lobules from the subcutaneous fat. These lobules, after almost losing their pedicles and blood-supply and with thickening of their capsules, constitute hard spherules freely movable in the subcutaneous tissue. Probably in time they become minute oil-containing cysts, with thickened fibrous or even calcareous walls.

In the present case these subcutaneous spherules form the most remarkable feature, and there are only a few of the "atrophic" scars which usually constitute the most important character of the Ehlers-Danlos syndrome. The spherules probably also occasionally occur in cases which are not obviously examples of the Ehlers-Danlos syndrome.

The Ehlers-Danlos syndrome is probably not so rare as is supposed. Since Parkes Weber's paper in December, 1936, cases from three families have been demonstrated before the dermatological section of the Royal Society of Medicine in London, and cases have been heard of from elsewhere in England.

REFERENCES

Ronchese, F. (1936) *Amer. J. Dis. Child.* **51**, 1403.
Tobias, N. (1934) *Arch. Derm. Syph.* **30**, 540.
Weber, F. P. (1936) *Brit. J. Derm.* **48**, 609.

FATAL INFECTIONS BY HÆMOLYTIC STREPTOCOCCUS GROUP B

By R. M. Fry, M.R.C.S. Eng.

ASSISTANT DIRECTOR OF THE BERNHARD BARON MEMORIAL RESEARCH LABORATORIES, QUEEN CHARLOTTE'S MATERNITY HOSPITAL, LONDON

Lancefield (1933) described a serological method for differentiating the hæmolytic streptococci into a number of groups. Two years later Lancefield and Hare (1935) added to these groups and showed that practically all *severe* human hæmolytic streptococcal infections, in the puerperium at least, are caused by streptococci belonging to Group A. They found in their series 18 *mild* infections due to streptococci of groups other than A, and of these 7 were Group B.

This finding, of the paramount importance of Group A hæmolytic streptococci in human infections, has now been confirmed on a much larger number of patients at Queen Charlotte's Hospital Isolation Block, but a few exceptions to the general rule have appeared. Of these exceptions, the infections by Group B streptococci appear to be the most important. Between January, 1936, and October, 1937, seven patients have been admitted with Group B infections; of these one died. Two other patients died in 1934 who were infected by hæmolytic streptococci which were known to be atypical, though at that time we were not doing serological grouping as a routine. These streptococci were fortunately preserved, and have since been found to be members of Group B.

There are thus three fatal cases of Group B infection in the records of Queen Charlotte's Isolation Block, and the clinical history and anatomical findings are of some interest, if only to support the belief that the division of the hæmolytic streptococci into groups represents a true difference between the streptococci, and that the members of different groups give rise to different pathological conditions in the body.

SUMMARY OF CASES*

Case 1

Primipara, aged 29; 36 weeks' twin delivery, the first by forceps; placenta and membranes expelled intact. Onset of fever on 3rd day. Admitted to the isolation block on 6th day.

On admission: temperature 99·2° F., pulse-rate 110. Abdomen moved well, and was soft and flaccid. Small vaginal laceration and several small cervical tears. Foul-smelling clot in uterus. Culture from vaginal swab showed heavy growth of hæmolytic streptococcus, Group B. Some pain in left shoulder. On the 13th day the temperature, which had been low, rose to 102·4° F., and the patient complained of pain on breathing in right side of chest. No rise in respiration-rate. By the 25th day she felt much better, with very little pain, but by the 30th day she again had pain in right side of chest, with some dyspnœa. The temperature, pulse- and respiration-rate were all high. The chest was aspirated on the evening of the 30th day, and a small quantity of foul-smelling pus was drawn off. On the following day 12 oz. of pus was drawn off, and on the 33rd day 46 oz. She died on the morning of the 34th day.

Cultures of the pus from the chest showed hæmolytic streptococcus Group B. Blood cultures were consistently sterile.

Post-mortem examination eight hours after death showed 10 oz. of thick yellow pus in the right pleural cavity. The right lung was collapsed, and both visceral and parietal pleura were covered with a thick shaggy layer of fibrin. The lung was firmly adherent to the diaphragm and pericardium. On the left side there was a little early pleurisy at the base. The left lung was slightly œdematous but otherwise normal. The pericardium contained a few ounces of slightly turbid fluid and a few flakes of fibrin. The heart was not enlarged and appeared normal. In the abdomen there was a large collection of pus, similar to that in the pleura, in the lesser sac and between the layers of the left triangular ligament of the liver. The liver on section showed an unusual picture of multiple abscesses. The two largest of these, in the upper part of the right lobe, measured 6 by 3 cm. and 4 by 2·5 cm., the smaller of these being filled with thick yellow pus and the larger containing brown granular debris. Round these were a number of smaller abscesses, and spreading to the left was a chain of similar abscesses, near the upper surface of the liver, varying from 2 mm. to 2 cm. in diameter. Microscopically these smaller abscesses showed a mass of debris, degenerate polymorphonuclear leucocytes and many clumps of streptococci. In the immediate neighbourhood of the abscesses the liver showed a good deal of destruction of the cells and replacement by collagen. In the portal canals Glisson's capsule was thickened and infiltrated by polymorphonuclears, and there was patchy fatty degeneration throughout the liver. The spleen showed a small infarct near the upper pole, apparently old, showing no sign of recent infection. The uterus was small and well involuted, and showed no signs of sepsis, macroscopically or microscopically. The only other abnormality was in the inferior vena cava, which contained a small piece of ante-mortem clot adherent to the posterior

* In the summary, any days mentioned by number refer to days *after delivery*, unless otherwise stated.

wall at the bifurcation. This clot was partly organised, and showed no evidence of recent sepsis.

CASE 2

Primipara, aged 28; 40 weeks' normal vertex delivery. Onset of fever on 9th day. Admitted to isolation block on 17th day.

On admission: temperature 101° F., pulse-rate 120. Abdomen soft and moved well. Uterus bulky, slightly retroverted. Some œdema of ankles. Liver enlarged and tender. Short presystolic murmur in heart. Blood culture showed hæmolytic streptococcus Group B, 1 per c.cm. The day after admission she became comatose. Pupils unequal and fixed. Knee-jerks present. Lumbar puncture showed cerebro-spinal fluid under slight tension, but clear; culture was sterile. The coma persisted until the time of death. By the 25th day there was commencing gangrene of the left foot, and on the 26th day the right foot was involved. She died on the evening of that day.

Cultures.—Blood culture on the 18th day showed hæmolytic streptococcus, Group B, 1 in 3 c.cm., on the 19th day 6 per c.cm., and on the 21st day 366 per c.cm. Further cultures from cerebro-spinal fluid were all sterile. Those from the vagina and cervix showed no hæmolytic streptococci at any time, anaerobic streptococci, diphtheroid bacilli, and *Staphylococcus albus* only being found.

Post-mortem examination, 17 hours after death, showed acute infective endocarditis, involving the mitral and aortic valves. On the mitral valve there was a mass of rough, friable vegetations covering the greater part of both cusps. On the aortic valve were two small vegetations, each about 1 mm. in diameter. There was no spreading of the vegetations on to the cordæ tendineæ or the auricular or ventricular walls. In addition to the commencing gangrene of both feet, noted during life, there was septic infarction of the spleen and both kidneys, and of the brain. This last took the form of a number of small areas of softening in the cerebral cortex, on the surface of the island of Reil on each side, and in the lenticular nucleus on each side. Scrapings from these areas showed many polymorphonuclear leucocytes and streptococci, and cultures showed hæmolytic streptococci similar to those found in the blood cultures. The meninges were normal. The uterus was well involuted, and showed no macroscopic or microscopic evidence of recent sepsis.

CASE 3

Woman, aged 46; 4-para.; 40 weeks' uncomplicated breech delivery. History of chorea at the age of 9. Onset of fever on the 4th day and treatment with Prontosil. No details are available as to amount of fever before admission, quantity of prontosil given, or whether red prontosil or sulphanilamide.

On admission to the isolation block on 18th day: Abdomen soft and not tender. Temperature, 99° F., pulse 96. Uterus subinvoluted. No evidence of any extra-genital spread of infection. Examination of heart showed presystolic murmur and occasional extrasystoles. The same evening the temperature and pulse-rate rose to 103·4° F. and 130. These both remained high till the 20th day, when sulphanilamide was given for 24 hours and the temperature fell to normal, the pulse-rate remaining above 100. The temperature rose again on the 23rd and 24th days, but again became lower under the influence of sulphanilamide and then remained normal till death, the pulse-rate always keeping high. The Wassermann reaction was negative. On the 26th day the apex-beat was ½ in. outside the nipple line. There was then some breathlessness, and the respiration-rate rose for the first time. On the 27th day the mental condition became poor, and in the evening hemiplegia developed. She died in the evening of the 28th day.

Cultures from the vagina on admission (18th day) showed *Staphylococcus albus* and diphtheroid bacilli only. The urine was sterile. Blood culture on the 20th day showed hæmolytic streptococcus Group B, 240 per c.cm. The following day Group B streptococci were found in the vaginal swab. Blood culture on the 24th day showed 1200 Group B streptococci per c.cm.

Post-mortem examination, 18 hours after death, showed dilatation of the right side of the heart. The left auricle was dilated and hypertrophied, and the left ventricle was normal in size. The mitral valve showed old thickening of both cusps, with almost complete rigidity of the edges, and shortening of the cordæ. On the anterior cusp was a large, cauliflower-like, friable mass, covering most of the surface of the cusp and extending down the cordæ to the ventricular wall. The other valves were normal. The pericardium showed no recent infection, but there was a small patch of old adhesions over the anterior surface of the right ventricle. The lungs and liver showed passive congestion, and there were septic infarcts in the spleen and right kidney. The uterus contained a number of fibroids, but was otherwise a normal involuting uterus, showing no signs of recent sepsis. In the head the meninges were normal. The only lesion found in the brain was one small area of softening just under the surface of the island of Reil on the right side. Sections through this show a few small thrombosed vessels and scattered patches of polymorphonuclear infiltration with karyolysis in the brain cells.

DISCUSSION

It is difficult to estimate accurately the incidence of infections by hæmolytic streptococcus Group B, as the material available is necessarily scanty. From January, 1936, to November, 1937, out of 211 patients infected by hæmolytic streptococcus (all groups), only 7 (3·3 per cent.) have been Group B infections, of whom only one has died. It is not known how many non-fatal cases there may have been in previous years, since grouping was not used as a routine method before 1936, but it is possible to state with some certainty that there were no fatal cases other than the two in 1934 described above, since streptococci from fatal cases have always been kept and studied with particular care.

Of the three patients described above, Case 1 is quite unlike any other case of puerperal sepsis that I have seen in the past six years. The striking features in this case were the subphrenic and multiple liver abscesses, and the pleural effusion with thick layers of fibrin firmly adherent to the pleural surfaces. Such a picture forms a marked contrast to the Group A infections, in which a characteristic feature is the absence of localised abscess formation, and in which fibrin is deposited on the serous surfaces generally in the form of thin smooth plaques, easily peeled off leaving a smooth surface. These features are possibly connected with the production of fibrinolysin by the Group A streptococci (Tillett and Garner 1933). Of the uterus little can be said, since there were no signs of sepsis by the 34th day, but as Group B streptococci were found in the vaginal swab on admission on the 6th day the infection presumably started in the genital tract.

Cases 2 and 3, which were so alike in their clinical course and morbid anatomy, are in an entirely different class from Case 1. In these two the prominent feature was the valvular lesions in the heart. In neither is there any evidence of a genital tract infection with Group B streptococci on admission, and one of them never showed these organisms in the vaginal swab up to the day of death. Both patients, however, showed positive blood cultures on admission. In neither was there any post-mortem evidence of uterine sepsis, but this may have little significance three to four weeks after delivery, judging by the appearances seen in some other of the less acute infections, notably those caused by anaerobic streptococci. In view of the positive blood cultures with the absence of Group B streptococci from the vagina it seems likely that Cases 2 and 3 were not primarily genital tract infections.

A comparison between these two cases of endocarditis and endocarditis due to Group A hæmolytic

streptococci would be interesting, but is difficult on account of the scarcity of known Group A cases. In the Queen Charlotte's series there is only one with endocarditis due to a known Group A hæmolytic streptococcus. In this patient the valvular lesion consisted of a small flat elliptical plaque on the posterior cusp of the mitral valve, measuring 5 × 3 mm., only slightly raised above the surface of the valve, roughened and pale orange in colour, with a slightly raised edge. This is in sharp contrast to the large masses of friable vegetations seen in the two patients reported above. This difference does not seem to be due merely to a difference in the acuteness of the infection, as the Group A patient died on the 20th day after the onset of fever, while the duration of fever in the two Group B patients was 15 days and 24 days. A further interesting difference is shown in the frequency of endocarditis in these infections. In the last two years about 90 per cent. of all hæmolytic streptococcus infections in the Isolation Block have been due to Group A, and only 3·3 per cent. to Group B. We may safely assume that roughly similar figures would have been found in previous years if the streptococci had been grouped. In spite of this, we have only one recorded case of Group A endocarditis in the last six years, and two due to Group B streptococci. It is clearly impossible to generalise on three cases, but the differences are so striking that I should welcome further information, and particularly cultures of hæmolytic streptococci for grouping from any cases of endocarditis if there is any chance of subsequent access to post-mortem material.

There is little information available as to the source of infection in these three patients. In Case 1 the throat and nose of the patient herself and those of the doctor and nurses in attendance at the delivery were all negative for hæmolytic streptococcus. The infection may well have originated from organisms already in the vagina, for it is known that hæmolytic streptococcus Group B is occasionally present in the vagina before delivery (Hare and Colebrook 1934, Lancefield and Hare 1935). In Cases 2 and 3 the possibility of a genital origin is ruled out by the negative vaginal cultures on admission and later, while the blood cultures were already positive. The throats in these two patients were not examined, and they may have been the source of the infection, for Hare (1935) isolated hæmolytic streptococcus Group B occasionally from tonsillar swabs. The other possible source is cow's milk, since Group B streptococci are commonly associated with bovine mastitis, and it is conceivable that the infections in Cases 2 and 3 were both milk-borne infections originating or lit up soon after delivery.

SUMMARY

Three fatal cases of infection in the puerperium by hæmolytic streptococcus Group B are described, and some points of difference noted between these and infections by hæmolytic streptococcus Group A.

An appeal is made for more information about hæmolytic streptococcal endocarditis, and especially for cultures from such cases.

My thanks are due to the staff of Queen Charlotte's Hospital for allowing me to make use of the clinical records of these three cases.

REFERENCES

Hare, R., and Colebrook, L. (1934) *J. Path. Bact.* **39**, 429.
— (1935) *J. Path. Bact.* **41**, 499.
Lancefield, R. C. (1933) *J. exp. Med.* **57**, 571.
— and Hare (1935) *Ibid*, **61**, 335.
Tillett, W. S., and Garner, R. L. (1933) *Ibid*, **58**, 485.

INCIDENCE OF WEIL'S DISEASE AMONG COAL-MINERS IN NORTHUMBERLAND AND DURHAM

BY W. G. A. SWAN, M.D. Durh., M.R.C.P. Lond.
MEDICAL REGISTRAR, NEWCASTLE-ON-TYNE GENERAL HOSPITAL; AND

J. A. McKEON, M.B. Durh.
ASSISTANT MEDICAL OFFICER, THE DISPENSARY, NEWCASTLE-ON-TYNE

IN 1935 we described 12 cases of Weil's disease among miners in the north-eastern coal-field (Swan and McKeon 1935). From that time until the end of 1936 we had seen 17 more cases of the disease, 14 of which were in coal-miners. Of the other 3 patients 1 was a gardener and 2 contracted the disease after immersion, one in the River Tyne and the other, a sailor, in a canal in France. Of these 17 new cases the diagnosis was confirmed by serological agglutination in all but 1. Of the total of 29 cases 9 (31 per cent.) were fatal.

Previous investigations into incidence.—Alston and Brown (1935) were the first in this country to examine the sera of healthy persons whose occupation exposed them to the risk of Weil's disease. Among 45 London sewer-workers who had no recollection of ever having had jaundice they found 9 men (20 per cent.) whose serum contained antibodies to *Leptospira icterohæmorrhagiæ* in titres of between 1/30 and 1/100. Smith and Davidson (1936) examined the serum from 210 fish-workers in Aberdeen and found immune bodies in 51 (24 per cent.), but in this group 9 persons were known to have had Weil's disease in the past. As a control they examined 403 sera sent for Wassermann and Widal reactions and these were all negative.

Present series.—In an effort to estimate the incidence of subclinical infection with *L. icterohæmorrhagiæ* among coal-miners in our area we visited two collieries in the autumn of 1936. In one of these (Colliery E) 6 cases of Weil's disease occurred between February, 1935, and December, 1936, the last being after our visit. In the other colliery (Colliery F) 3 cases had occurred in May and June, 1936. We had seen personally all these 9 cases and in all the diagnosis had been confirmed by serological agglutination. Among the miners at these collieries 101 volunteered to give blood for examination and Major H. C. Brown of the Wellcome Bureau of Scientific Research very kindly consented to examine the sera.

From Colliery E 81 sera were obtained. In this colliery one seam was particularly suspect, 5 cases having arisen in men working in it; the seam was wet and infested with rats. Colliery F provided the remaining 20 sera. It had always been a dry pit until some old workings containing water were opened into. A short time after this event the 3 cases developed, all in men working in the same seam.

Results.—Of the total of 101 men all gave negative agglutination results except 2 from Colliery E. These 2 men gave histories of a serious illness with jaundice eighteen months previously which seemed to be clinically identical with Weil's disease. Both their sera agglutinated to a titre of 1/300. The remaining 99 men for the most part gave no history of any previous illness whatever, and none gave a history of anything in the least resembling Weil's disease. All their sera showed a negative agglutination at a titre of 1/30. None of the men had worked as miners

for less than a year, the longest period at work being 46 years. The average mining life of the men was 23¼ years.

All the men had worked in the suspected areas at one time or another; in Colliery E 29 men, and in Colliery F 13 men were actually working in the suspected areas when cases of the disease were occurring.

SUMMARY AND CONCLUSIONS

The blood of 101 coal-miners exposed to the risk of infection with *L. icterohæmorrhagiæ* was examined for the presence of immune bodies. In only 2 cases were they present and both of these had presumably had severe Weil's disease in the past. These results are at variance with those previously published relating to sewer-workers and fish-workers. There seems to be no adequate explanation for this and we can only conclude that the incidence of subclinical Weil's disease among coal-miners in the North East of England is less than might have been anticipated.

REFERENCES

Alston, J. M., and Brown, H. C. (1935) *Brit. med. J.* **2**, 339.
Smith, J., and Davidson, L. S. P. (1936) *J. Hyg.* **36**, 438.
Swan, W. G. A., and McKeon, J. A. (1935) *Lancet*, **2**, 570.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF MEDICINE

AT a meeting of this section held on Jan. 13th, with Prof. H. LETHEBY TIDY, the president, in the chair, a discussion on certain aspects of

The Asthma Problem

was opened by Dr. FRANCIS M. RACKEMANN (Boston). Asthma, he said, was obviously a symptom and usually depended upon allergy. It was very common, for 2 or 3 per cent. of the population had either asthma or hay-fever; and it was interesting as depending more upon the reaction of the host than upon the nature of the exciting agent. To understand the reason for asthma and its nature would be a great step towards understanding immunity in general.

Asthma, hay-fever, and eczema depended upon reactions of an immediate urticarial type, readily demonstrable by a skin test. Some authorities believed that eczema was caused by a reaction in the superficial and urticaria by one in the deeper layers of the skin. These reactions occurred in normal as well as in allergic subjects, and could be reproduced in animals. A large dose of horse serum would produce a positive skin test in most normal persons. Patients recovering from pneumonia or infested by a parasite would often give a positive skin test to the specific pneumococcal carbohydrate or to an extract of the parasite. Delayed reactions also took place up to 48 hours after the exposure; a classical example was the reaction to tuberculin. The delayed and the immediate reaction could be correlated to show that each played its part in the development of normal immunity. Dr. Rackemann quoted illustrative cases of patients sensitive to lobster, wheat, and ragweed. Sensitiveness, he said, was exquisite, often multiple, and hereditary. The symptoms associated with asthma were characteristic: low blood pressure, rapid pulse, quickness to tire, and an illness during the attack which suggested some hostile agent apart from the asthma itself. Many persons would give a positive skin test who never had an attack. The process seemed to be different, but he did not know whether it were really so or merely a variation of the same phenomenon.

The manner of production of the symptoms was a fundamental problem. He doubted whether the lesion in asthma was an extension down the throat of the hay-fever reaction. He never saw laryngitis in either type of condition. Some patients with food allergy had abdominal symptoms, and in others these symptoms might complicate a condition which depended upon dust. In a few patients migraine was due to food or dust. All these symptoms must depend on local tissue sensitiveness, but the offensive agent was presumably carried in the blood. If the serum of an egg-sensitive patient were injected into a normal person, a reaction would appear at the site when an egg was eaten. The serum of a ragweed-sensitive patient would make a normal person react positively to a skin test with ragweed extract made at another point. White of egg given to dogs appeared unchanged in the blood. Some of the remote symptoms of allergy might be explained by assuming a blood-borne agent.

Few patients died of asthma, but in one who had died in an acute attack through suffocation, macroscopic section showed the lungs studded with plugs of tough, sticky, tenacious mucus. Some workers thought that the mucous glands in the walls of the bronchi were hypertrophied and over-active. This appeared to be the real lesion. Fibrin was deposited, and eosinophils and small round cells multiplied. These obstructions would account for all the symptoms. Dr. Rackemann doubted whether this hypertrophy could be interpreted as an allergic response, and suspected it to be due to a peculiar nerve reflex. He was attracted by the theory that the hostile agent was choline esterase, the ferment which broke down acetylcholine. He declared that if English-speaking workers combined, they might produce noteworthy results.

Prof. L. J. WITTS described asthma as a very discouraging problem. The physician could, he said, establish a modus vivendi with many patients and pretend to benefit them by desensitisation, vaccines, or non-specific therapy. When they were followed up they were too often found to have relapsed, or to be reacting to another kind of agent or in another way. So much of the work done on allergy concerned the trigger and not the gun. None of the asthma remedies could be called a "real winner" in the sense of the recently discovered drugs which controlled abnormalities of muscle and secretion. The most fundamental approach was, he thought, the search for a general bodily disturbance. Psychic factors, though they were not the whole story, caused striking variations, and physical exercises modified the condition. The soil rather than the seed must be studied.

Dr. E. R. BOLAND regarded the difficulty of assessing results of treatment as in itself a criticism of therapeutic efforts. Patients would produce every permutation and combination of improvement short of cure, but he gravely doubted whether objective evidence of real improvement existed, or, if it did, whether it was not a result of chance, lapse of time, or change of season. The history often belied a patient's optimism: he would claim to be better but really be having just as many and as severe attacks. Improvement often went with a change in the actual

or psychological situation. Normal saline seemed to be as effective as any drug with a specific action or as protein desensitisation. Remedial exercises were a more helpful addition to general treatment than were desensitisation or saline. Vaccine therapy showed no particular promise. He advised closer study of individual attacks and their causation. Better results would, he thought, be obtained from desensitisation if skin tests were more reliable. Progress would be assisted by a common technique and standardised preparations.

The PRESIDENT recalled Osler's observation that the common end of urticaria patients was death from nephritis and uræmia, and said that he had seen patients die apparently from this cause without any evidence of renal disease. A condition might exist in which the brain imitated death from uræmia without any change in the kidney or the blood-urea. During a serum reaction the blood contained heterophil agglutinins—agglutinins and hæmolysins to sheep's red cells. Only one other condition—glandular fever—produced this reaction. He drew no deductions from this striking fact.

Dr. L. S. T. BURRELL related instances in which a medical officer had an attack of asthma cut short by a call to a dying relative, and a relapse on realising its cessation; and an elderly lady had completely recovered from asthma after a bad motor-car accident. A follow-up investigation undertaken at the Brompton Hospital asthma clinic showed that three-quarters of young patients grew out of the disease spontaneously, a fact which somewhat compromised statistics of treatment. Medical men did not know how to treat asthma and worked entirely in the dark.

Dr. W. F. H. COKE declined to be so pessimistic, and claimed value for adrenaline combined with desensitisation, and for the new differential sedimentation tests which would distinguish between patients of the allergic, the microbic, and the aspirin-sensitive types. Bacterial asthma was overshadowed by allergy. The postnasal swab was most important, and even the aspirin-sensitive patient could be cured by suitable vaccines. Shock might produce an effect by liberating large quantities of adrenaline.

Dr. G. W. BRAY maintained that the mode of absorption of allergens was almost always lymphatic. He pointed to the results of investigating a number of cold-sensitive children who developed angio-neurotic œdema on dipping the hand into cold water: a swelling of the glands was noted immediately, and quickly extended to the axilla. Some of them developed an asthmatic attack, which could be prevented by applying a tourniquet to the arm. Other experiments had shown that egg-white given by the stomach could be found in the lymphatic ducts but not in the portal vein. A similar condition of the lymphatic vessels might be present in glandular fever. The mucous glands were hypertrophied in adults only, not in children. If the asthma were due to a spasm of the muscle, it ought to occlude the ducts and prevent the large volumes of fibrinous material from entering the glands during an attack. Hypertrophy with a damming back of the mucus was a mechanical phenomenon rather than a primary cause.

Dr. RACKEMANN, in reply, said that children who outgrew asthma were really cured through disappearance of the underlying mechanism. Treatment was effective when the asthma depended on a specific cause which was discovered. To be of value the history of a case must explain not only why the asthma occurred but why it disappeared; it must account for all the time, and look for reasons of remission. One of the major difficulties in understanding the disease was lack of controls. Residence in hospital might itself be the treatment.

SECTION OF THERAPEUTICS AND PHARMACOLOGY

A MEETING of this section was held on Jan. 11th, Dr. J. W. TREVAN, the president, being in the chair. A discussion on

Nutritional Therapy in Pregnancy

was opened by Dr. R. A. MCCANCE. He described the results of an analysis of the food eaten in pregnancy by 116 women at different economic levels. About 50 were wives of unemployed miners in South Wales and Northumberland, 20 the wives of employed labourers in Bermondsey, London, 21 were of the artisan class living in Camberwell, London, and 22 belonged to the professional classes and lived in various parts of the country. The women had been weighed and measured and in 77 the hæmoglobin had been determined by Haldane's method. The composition of the diets had been calculated from analyses made at King's College Hospital. The food eaten by each woman varied considerably in amount from day to day and it was considered that a week was the shortest time in which a reliable assessment of an individual's diet could be made. The composition of the diets was affected by at least two considerations—personal taste and income. When classified according to the weekly income per head in the household (after deduction of rent) there were 16 women with less than 6*s*., 23 with 6*s*. to 9*s*., 19 with 9*s*. to 15*s*., 14 with 15*s*. to 25*s*., 13 with 25*s*. to 40*s*., and 22 with over 40*s*.

The average intake of calories in the different groups ranged from about 2100 to 2700 a day. The intakes of calcium, phosphorus, and iron increased fairly steadily in passing from the poorest to the richest groups and the differences in mineral intake were attributable largely to the gradual increase in the consumption of the so-called protective foods. Thus the greater proportion of milk taken by the richer groups explained the increase in calcium and the greater amount of brown bread eaten by the highest income group accounted for some of their greater iron intake, but a steady rise in amounts of eggs, green vegetables, raw fruit, meat, and fish was also partly responsible. The consumption of bread declined with rising income. How did these differences affect health? It was found that the women in the poorer classes were on the average shorter than the well-to-do, and the hæmoglobin level also rose in passing from the poorer to the richer groups, the differences between the first and last groups being in both cases statistically significant. A significant correlation had also been found between the hæmoglobin levels of individual women and their iron intakes. It seemed then that those in the poorer classes gave evidence of worse nutrition both at present and in the past. Judged by the standards set out by the technical committee of the League of Nations however the diets of even the richest income group were not entirely adequate. In these women the total calorie value must have been dictated by appetite and not by economic limitations, so that the committee's 3000–3500 calories a day may be in excess of that required by British women. The League's recommendations for calcium, however, were presumably based on careful assessments of

calcium balance and if their figure of 1·60 g. per diem is correct the diets of all the women in this investigation were deficient in calcium. The same line of argument showed that the women were not eating enough phosphorus. The cost of the League's recommendations for protective foods was estimated to be about 10*s.* 10*d.* a week. The analysis of the well-to-do women's diets showed that many would find it really difficult to carry out the recommendations without radically altering their natural food habits or greatly exceeding their chosen and probably physiological intake of calories. Practical remedies for the deficiencies seemed to lie in teaching women what articles of food to eat, in increasing the purchasing power (for food) of the poor, in communal feeding, and in medicinal supplements. The complete solution possibly called for a mixture of all four methods.

Dr. MARGARET BALFOUR described observations on the effect of adding certain concentrated food substances to the diet of pregnant women in South Wales. She said that a nutritional scheme for assisting expectant mothers in the special areas of England and Wales had been organised by the National Birthday Trust Fund in 1935 and had been gradually extended by aid of a grant from the Commissioner for the special areas until in the year 1937–38 the provision of foods for 12,000 expectant mothers had been estimated for. Each mother whose income was below a certain scale, irrespective of her physical condition, received per month 3 lb. of milky foods (Ostermilk, Ovaltine, or Colact) and ½ lb. of Marmite. These foods had been given during the last three months of pregnancy. There was some suspicion that the mother shared the milky foods with her family, especially with the young children, but the marmite she was more likely to take herself as she did not consider it so suitable for babies or the smaller children. The results up to June 30th, 1937, showed that among 10,384 mothers who had received the foods there had been a death-rate of 0·09 from puerperal sepsis (one maternal death) and among 18,854 mothers in the same areas who had not received the foods, there had been a death-rate of 2·91 from puerperal sepsis (46 maternal deaths). Cases of septic abortion had been excluded from the controls by counting only the deaths in the last three months of pregnancy. Maternal deaths from other causes had been rather less than half and infant deaths and stillbirths had been rather more than half those of the control series. The two classes of mothers might be considered fairly comparable. It was true that the Birthday Trust mothers received the foods from the antenatal centres, so they all had the advantage of antenatal care, while only some of the control series had this; but under present conditions it was not clear that antenatal centres, when taken in large groups, would have a lower rate of maternal mortality than other women of the area, owing to the greater proportion of abnormal cases and primiparæ. The foods given did not increase the proteins or calories of the diet to any great extent and the question arose whether the good result was due to a general improvement in nutrition and the power of resistance to disease due to the milky foods plus vitamins A, B, and D, or whether it was due to some other element that had a particularly beneficial effect on pregnancy and childbirth. Dr. Balfour suggested that the vitamin-B complex might act in this way by means of its action in increasing neuromuscular efficiency, in stimulating digestion and in preserving the integrity of the mucous membranes, so rendering the uterine passages more impervious to germs. A research committee composed of medical and scientific workers had recently been appointed by the Joint Council of Midwifery (of which the Birthday Trust Fund was one of the components) to carry on the future administration of the scheme. It was obvious that much more information was required to elucidate the results. Antenatal clinical officers were being asked to keep some records but it seemed desirable that research workers should be called in to assist at the clinics.

The PRESIDENT said he wished that Dr. Balfour could have provided her controls from within her own group, even at the cost of denying the foods to some of the women.

Dr. HELEN MACKAY thought, in view of the very interesting results obtained in the large-scale observation, the work should now be taken up in a somewhat different manner, by studying small groups of pregnant women intensively. She thought that in any intensive study observations were best made by the doctor or doctors responsible to the patient rather than by a separate observer. There was no doubt that remarkable results could be obtained by making good deficiencies in children's diets. It was therefore reasonable to expect that large reductions in the morbidity-rate of adults could be obtained in this country by similar means.

Prof. JAMES YOUNG said that the investigation in the depressed areas had been largely inspired by Lady Williams, and that the work throughout had been made possible through her enterprise and energy. It was difficult to explain the dramatic results completely on any other basis than that which Dr. Balfour had advanced. At the same time the reduction in the death-rate had been so great that it seemed almost too good to be true. The methods now in operation for checking the cases individually would, however, enable the exclusion of any fallacies that might have crept in. This matter had engaged the careful attention of the special committee of which he had recently been elected a member. Only 1 death from sepsis in 10,000 women who had received special nourishment was a very striking figure. At first sight it might almost suggest that the complicated technical detail in antisepsis and asepsis, which had grown up within recent times and which was regarded as an essential part of the prevention of sepsis, was hardly worth while. At the same time, as an obstetrician, he felt that until the evidence was overwhelming they could not assume that such a complete protection was obtainable from dietetic measures alone. There were many difficulties which might be quoted. In Rochdale it was known that the mortality had been reduced by 60 per cent. as the result of an intensive effort on behalf of the community, in which doctors, midwives, and patients were all concerned. This result was undoubtedly due entirely to an improvement in the obstetric service of the area and could not in any way be attributed to improvement in diet.

Dr. JANET VAUGHAN, commenting on the high incidence of anæmia in working-class women shown by Dr. McCance's work, described a carefully controlled series of observations made in America. Half the women had been given iron during the last four weeks of pregnancy and the others none. Those receiving iron had subsequently a hæmoglobin value over 70 per cent., but 24 per cent. of those without iron therapy had had a value below 70 per cent., representing a considerable degree of anæmia. Possibly the hæmopoietic effect of marmite might be a factor contributing to the results described by Dr. Balfour. She thought the additions to diet

should be studied one at a time.—Mr. A. L. BACHARACH thought the Birthday Fund patients could not be studied by making one addition at a time, since multiple deficiencies and an integrative action between more than one added factor were likely to be responsible for the effects. If it were possible to reduce the mortality and morbidity to nothing every effective addition to diet should be made and the results analysed subsequently.—Prof. J. MARRACK regretted making up inadequate diets merely by medicinal means.—Dr. PAYNE wondered why milk should be such an essential article for the providing of calcium in the diet of adults.

In reply, Dr. MCCANCE pointed out that many animals after weaning chewed and consumed bones and the same was true of Eskimos. Herbivorous and indeed all mammals were liable to go into negative calcium balance during pregnancy and lactation.—Dr. BALFOUR agreed that whole meals might be more satisfactory than special additions to the diet, provided the necessary elements could be given in the meals at reasonable cost, and provided the mothers could be induced to attend outside centres in large numbers.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY

AT a meeting of this society on Jan. 7th, with Dr. G. RICE-OXLEY, the president, in the chair, a discussion took place on the causes and treatment of

Sterility or Infertile Marriage

Mr. EARDLEY HOLLAND described a routine that he had often found successful. It began with an investigation of the history and a cursory gynæcological examination, after which the woman was given a prescription of thyroid gland in graduated doses. This first stage included an examination of the husband; Mr. Holland refused to have anything to do with the case unless the husband coöperated. The second stage of treatment, after three months on thyroid, began with a more complete examination of the tubes, using Lipiodol injection, which was much more reliable than insufflation of air. In a proportion of cases the lipiodol injection opened hitherto blocked tubes. The third stage of treatment was by means of hormones. In the large proportion of cases where there was genital hypoplasia considerable doses of the follicular hormone (œstrin) might be given.

Mr. KENNETH WALKER said that where a marriage was childless it would usually be found that there were adverse factors on the side both of the male and of the female. The importance of such conditions as infection of the genital tract had been exaggerated; it was true that gonorrhœa could produce absolute sterility but in most cases of childlessness the condition found was merely impairment of fertility. Ten years ago in such a discussion he would have laid chief emphasis on local conditions; to-day he would lay it on constitutional troubles. Endocrinology offered some hope, though not every case was due to endocrine dysfunction.

Mr. V. B. GREEN-ARMYTAGE thought it important that medical officers and matrons of girls' schools should carefully observe the time of onset and type of menstruation. Hypoplasia did not begin at the age of 25 when the woman came to the gynæcologist; it began in early youth, and if care were taken at that period as to diet, exercise, and the giving of œstrogenic substances when necessary, subsequent infertility might be lessened. Mr. Green-Armytage was convinced that contraceptive measures in the early days of marriage were inimical to pregnancy later. Salpingography, he said, was carried out as a routine on the Continent, and if practitioners realised its ease and painlessness more cases of infertility would be investigated. It had the advantage over insufflation that it gave information as to whether both tubes were patent or only one, and whether there was any abnormality of the uterus.

Mr. F. J. MCCANN spoke of the damage done to the ductless glands in childhood by many of the exanthemata, the result being seen only after puberty. Irregularity of menstruation in the young girl should be looked upon as a serious condition demanding treatment, the treatment being first diet, secondly exercise, and thirdly medication. Mr. McCann added his strong belief that birth control measures did delay fertility for a considerable time, and might cause sterility. Birth control was the greatest menace to our race to-day, destroying the fertility of large numbers of women and not a few men.

INTERNATIONAL OPHTHALMOLOGICAL CONGRESS

THE fifteenth International Ophthalmological Congress was held in Cairo from Dec. 8th to 14th, 1937. The two main subjects discussed were, first, hypertension and retinal arterio-sclerosis, and, secondly, the relation of endocrinology to the eye.

Retinal Hypertension

Dr. H. P. WAGENER and Dr. NORMAN M. KEITH, of the Mayo Clinic, jointly presented the opening paper on retinal arterial hypertension. The ophthalmologist, they said, because of his wider and more intimate knowledge of the clinical details of retinal pathology, should be better equipped than the physician to observe the reactions in the retina that are associated with raised blood pressure and systemic vascular disease. If, as seems logical, the visible reactions in the retinal vessels are similar, though at times disproportionate, to the invisible reactions taking place in vessels of similar size throughout the body, it is clear that an explanation of the mechanism of these reactions in the retina will go far toward solving the mechanism of diffuse vascular disease. The responsibility of the ophthalmologist in the solution of this problem is great, and his opportunities are wide, for he is able to see these vascular changes from their inception and to study their modes of origin and progression.

Arterial hypertension is evidently an expression of a diffuse disease or abnormal condition of the arterioles throughout the body. The lesion of the arterioles results in an increase in the peripheral resistance in certain regions or in the whole of the arteriolar bed. The narrowing of the lumen of the arterioles, which is the apparent cause of the increased resistance, is not structural in the earliest phases of the disease. It must be regarded as due to increased tonicity of the vessel wall, to spastic constriction, or to a combination of the two. Whether the constriction is due to the action of a pressor substance directly on the arteriolar wall or through the medium of the sympathetic nerves, or simply to increased vasomotor stimuli is not known. If the causative factor of the arteriolar narrowing continues to operate, histological changes develop ultimately in various parts of the arteriolar system, for example, in the

peripheral muscles, the heart, the kidney, the brain, and the retina. Both these factors, functional narrowing of and structural wall changes in arterioles, appear to be present in the usual case of diffuse arteriolar disease of the so-called "essential hypertension" type.

Dumas divided essential hypertension into three phases. In the silent phase the patient is essentially symptomless. In the second, the established phase, the disease has become organic and visceral lesions are present. Cerebral hæmorrhages, cardiac failure, or uræmia may terminate this stage. It is possible, however, for the hypertension to pass into the third or involutional phase, in which the blood pressure drops and arterio-sclerosis dominates the picture—the hypotensive stage of hypertension. According to Bonamour, the retinal changes in Dumas's first phase are spastic in type. The blood pressure in the central artery of the retina is likely to be elevated disproportionately to that in the brachial arteries. Patients may complain of transient loss of vision, but post-spastic thrombosis of the central artery may result in permanent loss. In the second phase, retinitis develops in cases that are running a rapidly progressive course. If the disease progresses more slowly, sclerosis develops in the retinal arteries as a defence reaction. In the final involutional phase, the sclerosis in the retinal arteries is likely to be severe, and lesions such as arterio-sclerotic retinitis and retinitis circinata are characteristic. In Bonamour's opinion, retinitis of the hypertensive type is essentially vasospastic in origin. As a result of arteriolar constriction reactional dilatation and stasis develop in the capillary bed and serous and hæmorrhagic transudations take place into the retina.

The problem of the pathogenesis of albuminuric retinitis has been a consuming one almost since the beginnings of our knowledge of albuminuria as an expression of disease of the kidneys. Bright himself recognised that loss of vision was a symptom in certain patients with albuminuria. Most physicians at present agree that there can be a retinitis "of albuminuric type" in cases in which no renal insufficiency can be demonstrated clinically, and in which at necropsy the kidneys show no evidence of primary nephritis. The most logical explanation of the mode of origin of albuminuric retinitis seems to be Volhard's, who regarded both the arteriolar sclerosis of Verwey and the retinitis as a result of ischæmia due to spasm in the larger arterioles. Volhard's conception of ischæmic or angiospastic retinitis seems to be more generally applicable than any other to the retinal complications of hypertension and nephritis and to permit a more ready comparison of these complications with the other features of the disease.

Dr. Wagener and Dr. Keith, in conclusion, described a condition that they had reported in 1928 and which they termed the malignant hypertension syndrome. The objective findings are persistently elevated blood pressure, diffuseness of arterial and arteriolar thickening throughout the body, and minimal changes in the renal parenchyma of kidney. The important retinal alteration is the marked spastic and organic narrowing of the arterioles, with diffuse retinitis and œdema of the discs. The characteristic symptoms are nervousness, asthenia, visual disturbances, dyspnœa on exertion. All observers are agreed that the patients of this group are in a very serious condition. A follow-up of 146 cases showed that 80 per cent. of them died within a year.

Dr. A. BAILLIART (Paris), dealing with the clinical part of retinal arterial hypertension, stressed the value of his dynamometer. This estimates the diastolic blood pressure in the retinal arterioles, which is about 40 per cent. of the diastolic pressure in the brachial arteries. The pressures as measured by his method furnish a ready and probably fairly reliable method of determining variations from the normal in pathological states.

Dr. Y. KOYANAGI (Japan) also contributed a paper.

Endocrines and the Eye

The discussion on endocrinology and its relation to the eye was opened by Prof. JOSEF IMRE (Hungary). He said that recent investigations have shown that various disorders of the sexual glands are associated with pathological changes occurring in the eyes. Periodic hæmorrhages of the subconjunctival tissue, recurring conjunctival inflammations or, especially, phlyctenular kerato-conjunctivitis are not rarely found in close relation to menstruation. Filamentary keratitis, following atrophy of the lacrymal glands and often combined with arthritic processes, as a rule develops in women with ovarian disorders or in the beginning of climacteric. Keratoconus has been shown in many instances to be a manifestation of disorders of the thyroid gland and the gonads. Prof. Imre thought that there is a close connexion between acute and chronic glaucoma and abnormal folliculin production. The folliculin production of four glaucomatous patients, examined by reliable biological methods, proved to be exceedingly low, but the amount of prolan was normal. He pointed out that there is an undoubted connexion between the changes of the intra-ocular tension and the pituitary during pregnancy. Patients suffering from retinitis pigmentosa are treated nowadays with œstrin and in many cases improvement follows and the progress of the disease is arrested.

Other opening papers were read by Dr. SNAPPER (Holland), Dr. VON SZILY (Germany), Dr. JEANDELIZE and Dr. DROUET (France), and Dr. LE CASCIO (Italy).

THE LANCET 100 YEARS AGO

January 20th, 1838, p. 605.

From a leading article.

We have recurred so frequently to, and dwelt on, at such length, in the pages of this Journal, the manifold abuses of the system of medical instruction recognised in this country, that it is difficult to discover any new enormities which are left for us to expose and denounce. Our Medical Corporations, however, represent so many beds of corruption, in which rank weeds spring up with surprising fertility, that if we now return to evils which have many a time exercised our pen, it is because the public mind is familiarised with their magnitude, and therefore most eager for their reform. We return to them at this period, especially, when the curriculum of the *London University* is most probably on the eve of being issued. . . .

Our first topic—our favourite one for attack, because it is the strong hold of the enemy—is the CERTIFICATE SYSTEM, that incarnation of all which is absurd in principle, abortive and useless in practice, and foully dishonest in object. *Absurd* in principle: for what matters it where knowledge is acquired, provided it be comprehensive and sufficient? Is there a virtue in some stone walls above others? Does learning alight on a man because he has walked certain hospitals . . .? Senate of the *London University*, annihilate this unworthy system of certificate-mongering; . . . do away with certificates, and you at once secure a new system among our hospital physicians and surgeons. All will be changed: you will have activity instead of sloth; care, instead of slovenliness; regular attendance, instead of random visits; while the pains now taken in escaping from the delivery of lectures will be employed in preparing them.

REVIEWS AND NOTICES OF BOOKS

Pulmonary Tuberculosis in Practice

A Modern Conception. By R. C. WINGFIELD, M.B., B.Ch. Oxon., F.R.C.P. Lond., Medical Superintendent, Brompton Hospital Sanatorium, Frimley; formerly Tuberculosis Officer, St. Thomas's Hospital. London: Edward Arnold and Co. 1937. Pp. 122. 9*s*.

THIS book has been designed, as the preface explains, to bridge the gap between the general practitioner and the specialist whose coöperation is essential if pulmonary tuberculosis is to be diagnosed early, efficiently treated, and finally eradicated. The work has been divided into three sections. The first describes the development of the tuberculous lesion from the primary focus to the advanced disease of the terminal stage. Dr. Wingfield elaborates his own scheme with the aid of a diagram at the end of the book and a series of letters to denote the pathological elements that compose the lesion at its various stages, thus, T is used to denote a fibrocalcareous tendency, I the spreading disease or granuloma, while X signifies the presence of secondary infection. The advent of cavitation is indicated by adding "cav" to the symbol. It is not difficult to follow, at least for the specialist. The general physician would do well to study it carefully; for by so doing he will acquire a sound and practical knowledge of the natural history of the tuberculous focus that will stimulate his interest in the disease as a whole even if, in practice, he finds himself confronted mainly with TIX and TIX cav lesions.

In the second section Dr. Wingfield discusses the symptoms, signs, and treatment of the stages previously described. He supplies a helpful and impartial account of the management of a case of phthisis, making it clear when specialist assistance should be called in. The importance of radiology as opposed to physical signs in early diagnosis is justly emphasised in accordance with the modern phthisiological slogan that the tuberculous focus, like the small boy of Victorian days, should be seen and not heard. There are two points that call for comment. The account of the treatment of the cavitated open spreading fibrocaseous (TIX cav) lesion leaves the impression that thoracoplasty should follow hot-foot upon the heels of a failed pneumothorax as being the logical sequence of a decision that collapse is desirable. While, as the author suggests, it may be "bad medicine" to await the improbable "miraculous spontaneous cure" yet a few months of firm encouragement in a good environment will do much to check the spread of the disease and increase the T element at the expense of I. In our view thoracoplasty should only be considered when the maximum benefit has been attained from such a régime. Again, Dr. Wingfield's conception of recurrent infections of tuberculous cavities with the streptococcus as the explanation of periodic sharp febrile attacks with changed physical signs and diminished sputum output will not go wholly unopposed. A similar syndrome is common in chronic lung abscess when the bronchus draining the cavity becomes blocked and the pus is imprisoned. It is an indication for bronchoscopy. The secondarily infected quiescent tuberculous cavity (TX cav X lesion) and the chronic lung abscess, although ætiologically distinct, have become clinically identical.

The last section of the book is devoted to the treatment of certain special aspects and complications of phthisis in which the chapter on hæmoptysis deserves special praise. In a word, this is an excellent book. The general practitioner who reads it with attention is likely to find his approach to pulmonary tuberculosis profoundly changed.

Chemical Methods in Clinical Medicine

Their Application and Interpretation with the Technique of the Simple Tests. Second edition. By G. A. HARRISON, B.A., M.D., B.Ch. Cantab., M.R.C.S. Eng., Reader in Chemical Pathology in the University of London. London: J. and A. Churchill. 1937. Pp. 585. 21*s*.

THE book provided on its first appearance a new and useful bridge between the biochemist and the clinician; it soon became "Harrison" and found a place, not only on the shelf, but on the bench and desk. In its second edition the same general plan is maintained. Biochemistry as applied to diagnosis and treatment is discussed adequately although not comprehensively. No attempt has been made to rival such exhaustive reviews as those of Peters and Van Slyke; brevity and simplicity is the note struck and repeated. New tests are included, and those developments in biochemistry which have been applied successfully to medicine, such as zinc protamine insulin, and ascorbic acid. Several sections have been revised and extended. The scope and usefulness of the book have been greatly increased without an appreciable increase in its length.

The attempt to avoid complexity is sometimes carried too far; in order to make some chemical definitions and conceptions appear easy to grasp, Dr. Harrison has sometimes yielded to the temptation to distort them. Terms which in chemistry have a precise meaning are sometimes used loosely and even in a wrong sense—e.g., in the introductory definition of terms and description of standard solutions. Some of the sections on physical chemistry, such as that on *p*H, are poorly written. In his introductory remarks on the selection of methods of analysis Dr. Harrison says that "strong objection is taken to the phrase 'Good enough for clinical work'" (p. 2); but in some places he himself seems to be influenced a little by this objectionable maxim. Some of the methods described are or should be obsolete—e.g., Fehling's and Nylander's tests, Aufrecht's protein method, the Ewald test-meal; while certain new developments, like phosphatase, are only sketched in. Hesitation in discarding old and trusted procedures for new untried ones is commendable, but has perhaps been carried too far; the technique given for bilirubin tests and the old Brigg's method for phosphate should have been replaced by more modern procedures.

The best feature of the book is the emphasis on the medical aspects of the subject. The details of the tests selected, their interpretation, and their relation to the clinical condition are mostly presented with great skill and judgment. Some simple illustrations are included to help students and practitioners to grasp the more obscure physiological processes; for example, the picture of a man snatching eggs at a variable rate from baskets on an endless chain (p. 84) gives a clear notion of the urea clearance of blood by the kidney. Examples are given of all the more complicated calculations in the methods of

quantitative analysis, so that there should be no difficulty in following the arithmetic. All the pictures are good; they explain, more clearly than would be possible in words, the manipulations of the laboratory to the clinician, and those of the hospital ward to the laboratory worker.

Radiation Therapy

Its Use in the Treatment of Benign and Malignant Conditions. By IRA I. KAPLAN, B.Sc., M.D., Clinical Professor of Surgery, New York University Medical College. London: Humphrey Milford, Oxford University Press. 1937. Pp. 558. 30*s*.

THIS book appears as a new publication, but may be regarded as an enlarged and up-to-date edition of the author's "Practical Radiation Therapy," published in 1931. Dosage is discussed in relation to biological effects. X ray doses are given in "r" units without back-scatter, so that they are comparable, but radium dosage is still in terms of milligramme hours, or millicuries destroyed. Such units prevent discussion of the doses given to different types of tumour from being of value, and they suggest an explanation why the controversial subject of radio-sensitivity is dismissed as if the tables of radio-sensitivity quoted from other authors might be accepted as proved fact. The chapter on applied X ray physics by Carl B. Braestrup is on conventional lines but is sound and clearly written; it includes a description of apparatus for contact therapy and some notes on protection. The rest of the volume consists of a list of conditions treated by radiation. It is beautifully illustrated, and shows some good results. The large number of interesting rare cases treated at the clinic, together with the author's great experience in the commoner conditions, give value to the clinical chapters. It is unfortunate that old illustrations have been used, showing interstitial radium arranged in a radiating fashion like the spokes of a wheel, for this is a method now universally condemned. Special attention is drawn to a page of photographs of children born to mothers treated for sterility by stimulating doses of X ray delivered to the ovaries, sometimes accompanied by smaller doses to the pituitary. The author says that the method of treatment is "a very delicate modality, requiring judgment based on training and experience." It is not likely that many radiologists will emulate him, in spite of the surprisingly satisfactory results, which show that 44 out of 131 patients treated subsequently gave birth to living children.

The Cerebro-spinal Fluid

By H. HOUSTON MERRITT, M.D., and FRANK FREMONT-SMITH, M.D. London: W. B. Saunders Company. 1937. Pp. 333. 22*s*. 6*d*.

THIS book, based on 21,000 specimens of cerebro-spinal fluid examined in the cerebro-spinal fluid laboratory of the Boston City Hospital, commands attention rather by the authoritative statements made in it than by the presentation of new facts. The range of material is wide, and careful attention has been paid to detail in its examination. It is twenty-five years since Mestrezat published his pioneer studies on the chemistry of the cerebro-spinal fluid and nearly twenty since Ayer introduced cistern puncture. Since that time the clinical examination of the cerebro-spinal fluid by exact chemical methods, and the reason for the changes which it undergoes in disease have been intensively studied in the Boston City Hospital, and this book is an epitome of the work. In this large general hospital the fluid has been examined in many forms of disease other than those in which the nervous system is primarily involved, and the results of these examinations form the most interesting part of the book. In the section describing these, as well as in some others in which special emphasis is laid on the alterations in the chemistry of the fluid, the researches of other workers have been somewhat neglected, and although the bibliography is extensive, filling 33 pages, it does not include some important observations by English workers on the chemistry of the fluid in nephritis, meningitis, and other conditions. It is perhaps too much to expect that the authors should make an exhaustive analysis of their findings in every form of disease in relation to the work of others, but a careful survey of this kind might have prevented several ambiguous statements.

The book has practical value as a clear statement of the changes in the fluid which may be expected in every form of disease in which it is affected.

British Journal of Children's Diseases

IN the October–December issue Dr. F. R. B. Atkinson contributes a comprehensive article on Niemann-Pick's Disease, which he defines as a congenital, familial disease, confined to children, affecting chiefly the Jewish race and females more than males. It is characterised by enlargement of the liver and spleen with progressive pigmentation of the skin. The disease is the result of a constitutional disorder of the lipoid metabolism, especially of the phosphatides, and is always fatal. Only 42 cases have been recorded, of which a short résumé is given with particulars of the blood and chemistry in tabular form. There is also an extensive international bibliography.—In a paper on Congestive Heart Failure in Whooping-cough Dr. A. R. Thompson records the case of a girl aged 4 suffering from whooping-cough complicated by broncho-pneumonia, acute carditis, and extreme congestive heart failure with general anasarca. She was successfully treated by intramuscular injection of an organic mercurial diuretic in the form of Novurit. The pathology of congestive heart failure is discussed in relation to the present case and previous reports are reviewed.—Dr. L. J. M. Laurent records a case of Hæmophilia with Fatal Spontaneous Hæmorrhage from Pharyngeal Abscess. The patient was a male infant aged 9 months admitted to a fever hospital certified as suffering from nasal diphtheria. For four days he had been having some difficulty in swallowing, and on the day of admission he had developed a slight but persistent epistaxis. A culture of the nose was negative and no membrane was seen in the throat, but a swelling was found on the right side of the pharynx from which blood and pus were escaping. A diagnosis of right lateropharyngeal abscess was made, and the child was put to bed with the head low, and frequent small nasal instillations of adrenaline were given. A few hours later blood gushed out of the mouth and nose, and he died within two minutes. The necropsy showed an abscess cavity on the right side of the pharynx containing a good deal of blood, some broken down tissue, and a little pus. A search was made for an erosion of the jugular vein, internal carotid, external carotid, and its branches, but none could be found. Subsequently however a familial history of bleeding was obtained. Reference is made to similar recorded cases.

The abstracts from current literature are devoted to tuberculosis.

THE LANCET

LONDON: SATURDAY, JANUARY 22, 1938

EARLY TO RISE

OUR Rumanian correspondent has lately been writing about the way in which Prof. LIVIN CAMPEANU hurries his patients out of bed after operations. Some visiting surgeons, our correspondent says, were astonished to see people walking about on the day after appendicectomy and three days after radical cure of inguinal hernia. Such a sight would certainly seem remarkable to most of us, but CAMPEANU is actually only the latest of a number of medical men who have liked to see their patients on their feet again at the first possible moment after an abdominal operation. It is arguable, and argued, that prolonged immobilisation after laparotomy is just as unnecessary and just as harmful as prolonged immobilisation after fracture, and that early movement is as useful in the one case as in the other. The analogy however should not be applied without reserve, for there are important differences to be borne in mind.

In the first place a fractured limb is usually a healthy limb before the accident, whereas the abdomen has usually been diseased for a considerable time before a restorative operation is even contemplated. Of course, when we have to deal with an acute abdominal disease, such as acute appendicitis, acute cholecystitis or intestinal obstruction, the abdomen itself may have been previously healthy; but here the patient will probably be suffering from a toxæmia that precludes early mobilisation; he must have rest in which to recover from his bacterial infection. Then again, a man's health may be undermined by the loss of nutrition caused by a gastric or duodenal ulcer that has troubled him for years. If on top of this he undergoes the large operation of resection of the stomach, which is a further drain on his reserves, it will be out of the question to get him out of bed within the next few days. Indeed the best that could happen to him is that he should sleep for a week while his tissues are undergoing the necessary restorations and repairs. Thus the practice of early rising after abdominal operations appears appropriate only when the body operated on is comparatively healthy. This is more or less the state of affairs when the appendix is removed during the interval between attacks of appendicitis or when a hernia is repaired, and many surgeons in this country do in fact get the patient quickly out of bed after such operations. But naturally there are other considerations too. No abdominal operation can be performed without dividing the structures of the abdominal wall; these must grow together again, being held in apposition by sutures that are never more than scaffolding or splints; and the biological history of a healing wound is at least three weeks. It takes time for granulation tissue to turn into white fibrous tissue strong enough to withstand any strain, and a patient who is up and about may easily by some sudden movement, or a slip, put a strain upon his wound which at an early stage it is unable to bear. Such a strain is not likely to do much harm where the surgeon has used a muscle-splitting or transverse incision for an appendicectomy, but where the incision was paramedian the stress will always be at right angles to the cut. Nor can the fragility of the closing wound be reduced by putting sutures closer together; this will increase its strength for a couple of days but will lessen it thereafter, because it will reduce the blood-supply by strangulation of more vessels supplying the edge of the wound from which repair must take place. Movement will no doubt improve the circulation through the damaged abdominal wall and thus favour repair, but the patient can get enough of this movement by turning about in bed. True, this is not so encouraging mentally as return to normal upright posture; the psychological reasons for early rising are substantial, for the patient who is out of bed soon ceases to think himself an invalid and this is an aid to rapid convalescence. On the other hand, to some patients an abdominal operation of any kind is an emotionally exhausting experience and they need physical rest before they can get over it. They have neither the power nor the fortitude to leave their beds early, and if they attempt to do so their convalescence may be very much prolonged. A laparotomy is no small ordeal to many a sensitive person, and early rising is not likely to appeal to any save the robust and resolute.

The really serious argument in favour of getting the patient up quickly is that it may save him from thrombosis and pulmonary embolism. Perhaps it would be well indeed if most surgeons were to go a little further in Prof. CAMPEANU'S direction. Both in theory and in practice, however, it should be perfectly possible to secure for the patient, while still lying in bed, enough movement to prevent the venous stagnation that is held largely responsible for thrombosis and its deadly sequel. The difficulty is that exercise of this kind must be deliberately arranged and may be forgotten; whereas an ambulant convalescent can scarcely fail to provide it for himself.

VITAMIN D_2 AND VITAMIN D_3

IT is a pity, but there is now no doubt at all that vitamin D, which protects against rickets, exists in more than one chemical form. The actual number of forms is uncertain and is chiefly of academic interest, but there are at least two that are of general importance and WINDAUS has called them vitamin D_2 and vitamin D_3. They are the purified products of ultra-violet irradiation of ergosterol and 7-dehydrocholesterol respectively. The synthesis of the latter by WINDAUS and his colleagues [1] was a masterly achievement.

[1] Windaus, A., Lettré, H., and Schenck, Fr., *Liebigs Ann.* 1935, **520**, 98.

The discovery of rich natural sources of vitamin D in the halibut, tunny, blue-fin tunny, and swordfish has made it possible for HANS BROCKMANN [2] to isolate the vitamin from liver oils, and he has shown that the antirachitic vitamin occurring in Nature is identical with vitamin D_3 (irradiated 7-dehydrocholesterol). In cod-liver oil vitamin D is present only in comparatively small quantities, and its isolation from this source presents extraordinary difficulties; but hardly any doubt is felt that the vitamin D of cod-liver oil, too, is D_3. The first suspicion that natural vitamin D and the vitamin D of irradiated ergosterol are different intruded itself in a rather curious way. Vitamin D is much used in the poultry industry for prevention of leg-weakness in baby chicks and also onwards throughout the fowl's life. When irradiated ergosterol began to be employed for this purpose in America it was noticed to be much less effective than cod-liver oil; that is to say, if solutions of cod-liver oil and irradiated ergosterol were standardised with rats so that they had equal antirachitic potency, it might be found that twenty times as much of the irradiated ergosterol solution had to be given to chicks to produce the same protective or curative effect in rickets as was produced by the cod-liver oil solution. This observation was confirmed again and again, and experiments with purified vitamin D_2 and vitamin D_3 show that the difference is inherent in the substances and is not due to any extraneous circumstances.

The medical practitioner will at once ask how the human being, particularly the human infant, reacts. Not like a chicken, one can answer at once; but it is less easy to say for certain whether it reacts exactly like a rat or a little differently. Many attempts have been made in the United States and in Canada to try to decide whether cod-liver oil, irradiated ergosterol, irradiated milk, and other antirachitic materials are all equally effective in treating infantile rickets. Some workers thought that when the sources of vitamin D were standardised with rats irradiated ergosterol had about half or a third of the potency of cod-liver oil, while others could detect no difference. Of these studies that of MARTHA ELIOT and her colleagues [3] was the most impressive, and her conclusion was that there was no detectable difference. The truth of course is that all biological tests with animals are subject to a large error, so that one cannot be sure that the answer to the question posed is not really half or twice that which one has found. This is true even when one is using littermate rats of the same sex; but when one is using as test animals human infants of different age and mixed origin, whose general welfare must be the first consideration throughout, it is almost if not quite impossible to decide a question of a two or three to one difference. HERBERT BROCKMANN [4] has tried to arrive at an answer by treating rachitic infants with pure vitamin D_3 at the university pædiatric clinic in Würzburg, and he reports that this vitamin is at least twice as potent for infants as vitamin D_2. But his conclusion is open to grave criticism. He made no simultaneous comparison with vitamin D_2; moreover, he assumed that the daily dose of vitamin D_2 commonly given in Germany, 0·2 mg., or 8000 international units, is the minimum curative dose, and gave half or two-thirds of this dose of vitamin D_3 which brought about successful healing. The Addendum 1936 to the British Pharmacopœia 1932 gives 2000–3000 international units daily as the curative dose of irradiated ergosterol (vitamin D_2) for an infant, an amount below the amount of vitamin D_3 given by HERBERT BROCKMANN. In addition, no series of negative controls was included in this study, and owing to the curative effect of changes of season such a control series is regarded as indispensable in any finer quantitative studies. The conclusion reached by HERBERT BROCKMANN may be correct, but it is not justified by the data he presents and the medical profession should be wary in accepting the assumption that vitamin D_2 and vitamin D_3 have differing potencies for human beings. The point is one that it may be impossible to settle, owing to the difficulty of making quantitative tests with babies; but careful experiments with monkeys might give a definite answer that could be applied to infants with reasonable confidence.

[2] Brockmann, Hans, *Hoppe-Seyl. Z.* 1936, **241**, 104; Brockmann and Busse, A., *Ibid.* 1936, **245**, 96; 1937, **249**, 176.
[3] Eliot, M. M., Nelson, E. M., Barnes, D. J., Browne, F. A., and Jones, R. M., *J. Pediat.* 1936, **9**, 355.
[4] Brockmann, Herbert, *Klin. Wschr.* 1937, **16**, 1383.

OXYGEN-LACK IN MENTAL DISORDER

AT last year's annual meeting of the Royal Medico-Psychological Association the importance of anoxæmia in mental disorder was emphasised by a number of speakers long familiar with one or other aspect of the problem—Prof. F. L. GOLLA in his studies of the respiratory control of the acid-base relationship in the insane, Dr. F. A. PICKWORTH from the histological side, Dr. ALFRED MEYER in his work on the action of poisons and the oxidative activities of different parts of the brain, and Dr. E. GUTTMANN on the relation of anoxæmia and alkalosis to anxiety.[1] Investigation is also being actively pursued in the United States, as by MYERSON and his collaborators in Boston, the schizophrenia research group at Worcester, and elsewhere by HINSIE, GILDEA, MCFARLAND, and others. From Chicago [2] now comes a study of the arterial oxygen saturation in neurocirculatory asthenia. After emphasising the dearth of such observations on normal people and the variability of the normal findings, HICK and his colleagues describe the supplementary methods they employed (estimations of venous lactic acid before and after breathing oxygen, and of oxygen-consumption when breathing air and when breathing oxygen). The findings in 10 subjects with decompensated heart disease and in 8 normals were compared with those in 13 patients who had a neurosis of the "neurocirculatory asthenia" type. (The figures in only 6 of these cases, however, are tabulated.) In these 13 the

[1] Symposium on the Circulatory System and Mental Disorder, *J. ment. Sci.* 1937, **83**, 505.
[2] Hick, F. K., Christian, A. W., and Smith, P. W., *Amer. J. med. Sci.* December, 1937, p. 800.

blood leaving the lungs had an inadequate amount of oxygen; moreover, the respiratory quotient and oxygen-consumption altered when the patient breathed oxygen instead of air. The authors conclude that in these neurotics there is an actual oxygen deficiency of pulmonary origin, which accounts for their fatigue. It would have been useful if they had combined with their lactic-acid estimations an investigation of the glutathione content. The well-known difficulties in the way of interpreting lactic-acid variations, to which they seem to have given too little attention, make it instructive to compare their findings with those of earlier workers such as LOONEY and CHILDS,[3] whom they do not mention.

In a communication from the fatigue laboratory of Harvard University THOMPSON, CORWIN, and ASTE-SALAZAR [4] report that the differences in schizophrenic subjects between the gaseous content of arterial blood and that drawn from the internal jugular vein are remarkably consistent—more so than in a normal control group—and that they found no single physiological anomaly tested by them to be characteristic of the schizophrenics, inasmuch as occasionally they found also in members of the normal group high arterial carbon dioxide and low oxygen saturation, large differences in the gaseous content of the venous and arterial blood, and other variations. Fixity of the physiological processes which would, somewhat paradoxically, make physiological equilibrium difficult, was all that they could establish as peculiar to the schizophrenics, and they regard it as probably a constitutional phenomenon which precedes the actual illness.

Hard upon the heels of these reports comes an informative review by HOSKINS [5] of the work done during the past decade at Worcester, Mass., on oxygen metabolism in schizophrenia to which we have already alluded. The chief findings were the abnormally low range of the rate of oxygen-consumption (Benedict-Roth) and of blood volume, when this is referred to the surface area; the circulatory rate, measured by the cyanide arm-to-carotid method, was only 80 per cent. of the normal; the glutathione and lactic-acid levels in the blood were unduly closely related; and the patients were less responsive than normal persons to metabolic stimulants such as thyroid and dinitrophenol. HOSKINS thinks that the next step should be the study of the oxidative tissue reactions of material obtained at biopsy; one might object to this that there are not yet adequate normal data for comparison. He says, more dubiously, that the defective oxidation in schizophrenia may be due to abnormal metabolites in the internal milieu, which serve as anticatalysts at some stage in the oxidation sequence, and that it may be possible to detect these, using normal living tissue as the reactive system. Any work of this sort done on schizophrenia would require very critical scrutiny.

[3] Looney, J. M., and Childs, H. M., *J. clin. Invest.* 1934, **13**, 963.
[4] Thompson, J. W., Corwin, W., and Aste-Salazar, J. H., *Nature*, Dec. 18th, 1937, p. 1062.
[5] Hoskins, R. G., *Arch. Neurol. Psychiat., Chicago*, December, 1937, p. 1261.

INFANTICIDE

WRITING on her experience as a magistrate in cases of puerperal insanity, Mrs. R. H. CROWLEY comments [1] on the unfortunate emphasis at present laid on the criminal element. A mother suffering from puerperal insanity kills her baby and perhaps attempts suicide. These are two indictable offences. The police are brought in. When well enough to be charged, she is taken to the police-station where the charge is read over and explained to her. She is then brought before the local magistrates and, in the London area, is probably committed to Holloway pending trial at the Central Criminal Court. The result may be a sentence of detention at a criminal lunatic asylum "during His Majesty's pleasure," or, if her family can afford to pay for it, release on condition that she enters a mental hospital for treatment. Mrs. CROWLEY'S experience as a magistrate leads her to think that the medical aspect is too little considered. Incidentally she mentions seeing a few years ago in one of our provincial prisons an obviously distraught young woman in a cell with one side consisting of upright iron bars, caged like some savage animal. Inquiry of the prison governor elicited the information that this was a young mother awaiting trial for infanticide apparently committed under the influence of puerperal insanity. These were the conditions in which the community detained her for observation and presumably for treatment.

Puerperal insanity is said to occur approximately once in every 700 labours, usually within six weeks of confinement. Lactational insanity comes later and is less severe. The law still treats as murder the case where a mother deliberately kills her baby. These cases seem to be rare. The latest available criminal statistics show that only eleven persons were prosecuted in the year for murder of a child under one year of age. Out of this total (which was not restricted to mothers) nobody was found guilty of the major offence of murder. If a verdict of murder is returned, the judge must pass sentence of death, though the capital sentence is not going to be inflicted. In 1922 the Infanticide Act made it possible to pass a non-capital sentence, as for manslaughter, where the victim was a newly born child and where the mother, at the time of the wilful act or omission which caused its death "had not fully recovered from the effect of giving birth to such child and by reason thereof the balance of her mind was then disturbed." Unfortunately this effort of humanity, enacted mainly at the instance of judges who detested the duty of the death sentence, was largely negatived by a decision of the Court of Criminal Appeal. In R. *v.* O'Donoghue the trial judge was held to have been correct in deciding that, where a baby was born on August 19th and the mother took its life on Sept. 21st, there was no evidence fit to be left to the jury on which they could be asked to hold that the baby was "newly born" within the meaning of the Act. Lord DAWSON'S Infanticide Bill, which appeared in print just before Christmas,

[1] *Policewoman's Review*, December, 1937, p. 72.

proposes to eliminate the word "newly born," and to substitute for the words in the 1922 Act already cited the words "had not fully recovered from the effect of giving birth to such child, including the effect of lactation following upon such birth, and by reason thereof the balance of her mind was then disturbed." The Bill also contains a proviso to make clear that its provisions may apply up to the time when the child is twelve months old. This is a most desirable reform, but it still does not wholly cover Mrs. CROWLEY'S point—namely, that the accused mother is a fitter subject for observation and treatment in a mental hospital than in a prison cell. It seems indeed unjustifiable that such cases should be remitted to any place associated with the custody of criminals.

The effect of prison must be deplorable; even worse perhaps is the prospect and the ordeal of trial in the Central Criminal Court. There seems no reason why the administration of justice should not find a better way; recourse to statutory amendment of the law may not be essential. Suicide is no longer dealt with under the rigid routine of criminal justice. Parliament has not altered the law, but the police and the magistrates have quietly reformed it. In the introduction to the Criminal Statistics for 1930 we were told that in recent years it has not been the practice to prosecute for attempted suicide unless special reason exists. The special reason is usually interpreted as meaning the need to place the patient in custody for his own protection. The accepted modern practice in respect of attempted suicides is hospital first, and criminal prosecution either afterwards or, far more commonly, not at all. Infanticide, to use the word in a general and non-statutory sense, might well be dealt with in the same spirit. Like all other proposals for reform, the problem may prove less simple than the reformers suppose. The authorities concerned with the administration of criminal justice cannot be expected to overlook the occasional instances of the wilful murder of the unwanted child. The father of the child may resent the suggestion of the certification of his wife, or her commitment to a mental hospital in respect of what may prove a brief period of delirium, quite as much as public opinion resents the present arrangement of commitment to prison. The shorter the period, the greater perhaps would be the difficulty. The provision of suitable accommodation in an appropriate hospital may be the main crux. The prison medical service is enlightened and humane; it commands the confidence of the courts and of the public. The prison infirmary, however, is scarcely the ideal place for patients suffering from puerperal psychosis. These difficulties must be faced. The community cannot be satisfied with a system which sees in the distraught mother just another criminal lunatic.

ANNOTATIONS

POSTHUMOUS HONOURS

IT has been suggested that admission to the Dictionary of National Biography carries with it a passport to Heaven; if this is going too far, at least any "Worthy" (the dignified term applied in the index to those whose names are included) achieves an enviable measure of temporal immortality. The supplement now issued [1] covers the toll of less than a decade (1922–1930). Doctors may find just cause for pride in the number of their colleagues portrayed in this distinguished gallery. The first we meet is John George Adami, who did much to forge the link between pathology and clinical medicine; other pathologists honoured by a place include Samuel George Shattock, one of the first to give whole-time service to his subject, and Adrian Stokes who died at 40 of yellow fever whilst investigating that disease at Lagos. Physiology is represented by John Newport Langley, Noël Paton, William Bayliss, and Ernest Starling, names familiar to every medical student. A pharmacologist, Arthur Cushny, and a bacteriologist, William Leishman, complete a formidable list of laboratory workers. Louisa Aldrich-Blake, the first woman to become master in surgery in the University of London, was best known as the dean of the London (R.F.H.) School of Medicine for Women in its years of great development during the war. Among the physicians, Clifford Allbutt will be remembered for many reasons, not the least, perhaps, for his "scholarly care in the use of words." Next, in alphabetical order, come William Selby Church and Dyce Duckworth—two wise and whole-hearted physicians—and David Ferrier whose work on the localisation of cerebral functions made modern neuro-surgery a practical possibility. Here also are James Mackenzie, the general practitioner turned cardiologist; Patrick Manson, the father of tropical medicine; Frederick Mott, neuro-pathologist; Richard Douglas Powell, physician-in-ordinary to Queen Victoria; and John Thomson, the pædiatrician. Among the surgeons we find the names of Anthony Bowlby, Rickman Godlee, William Macewen, Thomas Teale, and, lastly, Frederick Treves, who wrested "perityphlitis" from the medical wards and cured it by surgery. Here also will be found Mary Ann Scharlieb, one of the first women gynæcological surgeons and, no less fittingly, Francis Champneys, one of the last of the obstetric physicians. Oto-laryngology is represented by Arthur Cheatle and William Milligan. But there remains a small group consisting of those who, having qualified in medicine, subsequently played truant and excelled in other spheres of activity. Such were Stephen Paget, who combined surgery with biography and the writing of essays, and Hugh Kerr Anderson, who started as a physiologist and came to wield, as Master of Gonville and Caius College, an influence which was the greater for his sensitive and modest bearing. John Kirk forsook medicine for natural history; Alexander Wollaston for exploration; Thomas William Smartt for politics; and Arthur Conan Doyle and Robert Bridges for letters. Edward Granville Browne turned his medical knowledge to good account in his oriental researches.

Doubtless, in a brave new world, it would be decreed that books of reference should be dull, lest, as with this one, the earnest student might be distracted from the matter in hand by the fascination of the text adjacent, but not relevant, to his parti-

[1] Edited by J. R. H. Weaver. London: Humphrey Milford, Oxford University Press. 1937. Pp. 962. 28s.

cular study. It is indeed difficult to content oneself with dipping into this book; the temptation is to read it right through.

AGREEMENT AMONG CARDIOLOGISTS

DURING the past few years the study of electrocardiograms taken with one electrode over the heart has shown that the curve obtained in this way is a valuable supplement to those obtained with the ordinary limb leads. Such a lead seems likely, indeed, to become part of the routine procedure of electrocardiography. Unfortunately a variety of methods of applying both the precordial and the indifferent electrode have been used, and the method of connecting them to the recording instrument has likewise varied, as well as the site of application of the precordial electrode itself in relation to the heart. For some time it has been realised that the confusion caused by these variations in technique and terminology must be resolved, and if the recommendations now made by a committee of the Cardiac Society, in collaboration with a committee of the American Heart Association, are generally adopted this end should be achieved. The Cardiac Society of Great Britain and Ireland is a body of some 60 or 70 members well qualified to speak for cardiologists in this country, and the same may be said of the American Heart Association for the U.S.A. By the method recommended (see p. 221) a relative positivity at the precordial electrode will produce an upward deflection, and this has the great advantage that the waves are usually in the same sense as those of the limb leads. The recommendation applies only to a single precordial lead, and the technique adopted with multiple leads, which are hardly practicable in routine work, must be left to the individual investigator.

POLIOMYELITIS IN NEW YORK

Dr. Alfred E. Fischer and Dr. Maxwell Stillerman [1] record their observations on 686 cases of acute poliomyelitis at the Willard Parker Hospital during the epidemic in 1935 when 2054 cases were notified in New York City. About the middle of July a greater seasonal prevalence of poliomyelitis than usual became evident, and the reported cases thereafter increased daily until the peak of the epidemic was reached in the last week of August. The decline began in September and continued in October, so that the seasonal curve exactly corresponded with that of previous outbreaks in New York. As regards the age-incidence of the 686 cases, about a third were under five years and three-quarters under ten; the oldest patient was aged forty-eight. Males (413) were affected more than females (273). In only 17 families (2·5 per cent.) did more than one case occur, so that communicability was low, and only 1 case of a second attack was noted. Non-paralytic forms were recognised more often than in previous epidemics. In such cases the symptoms were fever, vomiting, pain in the back of the neck, and other symptoms of meningeal irritation, and the spinal fluid contained at least 20 cells per cubic millimetre. Of 282 patients admitted to hospital without signs of paralysis only 57 afterwards developed paralysis. Treatment consisted in absolute rest in the early stage. After the temperature had been normal for several days and the tenderness of the muscles had disappeared plaster casts and splints were applied. After three weeks the patients were sent to their homes or to an orthopædic hospital if further treatment was required. The Drinker apparatus was used in 18 cases for respiratory distress, which in 8 was due entirely to weakness or paralysis of the muscles supplied by the thoracic or cervical segments of the spinal cord, while 10 showed evidence of bulbar as well as of thoracic involvement. Of the first group 6 survived, but in the second only 2. The fatality-rate for the Willard Parker Hospital cases was only 2·6 per cent. (18 cases), the lowest ever recorded in New York City. Of these 18 patients, 11 died in the first week.

[1] *Amer. J. Dis. Child.* 1937, **54**, 984.

MORTALITY EXPERIENCE AMONG INDUSTRIAL POLICY-HOLDERS

THE magnitude of the operations of the Metropolitan Life Insurance Company in the United States may be judged from the fact that the number, in round figures, of weekly premium-paying industrial policy-holders, which was already 8,000,000 in 1911, had mounted to 17,000,000 by 1935. An elaborate analysis has been made by L. I. Dublin and A. J. Lotka and their colleagues on the staff of the company's statistical bureau, of the mortality experience of these insured persons—working-class people, mostly town-dwellers—during 25 years.[1] Among the males, workers in the manufacturing and mechanical industries were heavily represented. Their age- and sex-constitution differed from that of the general population of the U.S.A.; data are available only for ages 1–74, and special methods of standardisation have had to be adopted. The methods of compilation and analysis of the data are described in an appendix, which should be studied by those who quote from the book, since there are peculiar difficulties in estimating the insured population at risk. As in all American vital statistics, separate statements of mortality for white and coloured (substantially negro) populations are given. The special value of this investigation depends on its compilation by one group of experts who have continuously scrutinised the day-to-day collection of data over a prolonged period, who are in a position to clear up doubtful death certificates by communication with medical practitioners, and whose survey embraces the whole 48 States.

The mean annual mortality in this group was at the rate of 9·2 per 1000, the standardised rate being 10·4. Between 1911–15 and 1931–35 the standardised rates for white males fell by 38·1 per cent., and for white females by 38·5 per cent. The reduction was greatest for both sexes in the 1–4 age-group and least and diminishing in age-groups over 45. The average duration of life (expectation of life at birth) has been extended by nearly 14 years, or approximately 30 per cent. The trends of mortality from groups of causes or separate causes are elaborately analysed in tables and charts throughout the text, and given in detail by age, sex, and colour in large tables appended. Here it is possible to mention only one or two points by way of illustration. Suicide followed with "uncanny exactness" the business index up to 1920, but since 1923 the parallelism was less apparent. Mortality from syphilis has fallen in whites but has risen in the coloured, probably as the result of more frequent diagnosis. As in other civilised countries cancer is an increasingly certified cause of death among males, but the standardised

[1] Twenty-five Years of Health Progress. A Study of the Mortality Experience among the Industrial Policy-holders of the Metropolitan Life Assurance Company, 1911 to 1935. By Louis I. Dublin, Ph.D., third vice-president and statistician, and Alfred J. Lotka, D.Sc., assistant statistician. New York: Metropolitan Life Insurance Company. 1937. Pp. 611.

rate among white females is falling slightly. While cancer of the breast is a notable instance of an accessible site which shows a rise, part of it may be due to transference, by more accurate statement of primary lesions, from the group "stomach, liver, &c.," which shows a decided improvement especially in women. The effect of serum treatment of lobar pneumonia caused by certain types of pneumococcus is shown in a reduction of fatality by about one half. Gastric ulcer is up in men but down and steadily falling in women; duodenal ulcer, though much less frequent, is also rising in men. Appendicitis, which formerly had its highest rates in the teens, figures more heavily now at later ages; the rates for young children and in middle and old age have risen more than enough to counterbalance a fall at ages 10–35. Diabetes is increasing, especially among women, but insulin has saved the lives of many young children and has delayed death in adults. The reasons for these and other changes in mortality are fully discussed and practical suggestions are made for attacking each disease problem in such a way as to accelerate the striking improvement in the health of the people which is reflected particularly in the records of tuberculosis and the acute infectious diseases. The analysis is a valuable contribution to the study of vital statistics.

DOGS AS PARATYPHOID CARRIERS

IN the course of the Croydon typhoid inquiry, evidence was given to the effect that *Bacillus typhosus* may be found in human but not in animal excreta. Until recently paratyphoid fever had never been recognised in a dog, but a paper by Dr. J. Caspersen in the October number of *Norsk Magasin for Laegevidenskapen* suggests that despite the comparatively high concentration of hydrochloric acid in their stomachs (about double that in man) dogs may not only suffer severely from a paratyphoid B infection but may also convey it to man. A human outbreak of paratyphoid studied by Caspersen occurred last March in a Norwegian railway-station community of about 1000 souls, whose water-supply came from two main sources and whose milk-supply came from one and the same dairy. *B. paratyphosus* was found in the fæces of the 6 persons whose illness was clinically characteristic of paratyphoid, and also in the fæces of 3 other persons showing no clinical sign of the infection. As many as 6 of the 9 fæces-positive persons lived in the same house, and 4 of the 6 were ill. Agglutination tests and the cultural behaviour of the bacilli in question having confirmed the diagnosis of paratyphoid B, and the milk and water having been excluded as likely sources of the infection because so many of the cases were in a single house, a search was made for a carrier likely to be responsible for the outbreak. The search proving negative among human beings, the local medical officer of health, Dr. H. Walther, investigated the antecedents of an eighteen-month-old bitch belonging to the house in question. She had suddenly fallen ill between Feb. 10th and 15th with violent diarrhœa which had lasted about three days. She was ill altogether for about a fortnight and was for a week so feeble that her owner thought she must be paralysed. She aborted on Feb. 20th, and was apparently well again about March 1st—i.e., a couple of days before the beginning of the human outbreak. About six weeks after she had recovered her fæces were examined for *B. paratyphosus*, which was not found. But her serum agglutinated paratyphoid antigen in a dilution of 1/320 after two hours. As her O-agglutination was weaker (1/40), and as an infection with a member of the salmonella group might conceivably have been responsible for the agglutination of the paratyphoid antigen, salmonella agglutination tests were carried out, but proved negative. To strengthen his case, Caspersen examined the sera of 23 other dogs, and did not once obtain agglutination of these sera with a paratyphoid antigen. The massive and almost simultaneous infection of the occupants of the house in question therefore seem best accounted for in terms of a canine infection, although a few of the later human cases may possibly have represented secondary human infections. The implications of Caspersen's observations are of course limited by the differences in biological properties between typhoid and paratyphoid B bacilli.

SHORT-WAVE THERAPY IN TUBERCULOSIS

IT is clear that a heating effect may be produced by radio short-wave therapy, but different observers differ about the existence of any additional curative factor. The suggestion has been made that tuberculosis should be treated with radio short waves, and investigations are reported [1] in which the influence of these waves on tubercle bacilli in vitro and on the development of tuberculosis in guinea-pigs has been examined. First, suspensions of virulent and avirulent human tubercle bacilli of various concentrations were exposed in test-tubes, using wave-lengths ranging from 4·8 to 186 metres for periods of 5–30 minutes; but they took no harm thereby. Later a wave-length of 2·8 metres was used, at room temperature and at 37° C., over a continuous period of exposure of 30 days, but again there was no appreciable effect on viability. In the second series of experiments guinea-pigs were given intravenous injections of a virulent human strain of tubercle bacilli and were then divided into two groups, one being subjected to continuous short-wave treatment for 30 days while the other was kept as a control. An uninfected group of animals was subjected to the ray treatment alone. At the end of the 30 days necropsy showed that all the infected animals had a generalised moderate amount of tuberculosis, with no difference between the two groups. Irradiation by itself had caused no gross changes. The investigators believe that there is no conclusive evidence of a specific biological action of high-frequency currents, and that short-wave therapy has at present no justification in tuberculosis.

EXPERIMENTAL INTESTINAL DISTENSION

IT is difficult to devise experiments on the intestines of animals in which the results are not vitiated by the onset of peritonitis. This, moreover, tends to cause acute ileus, so that the terminal symptoms may be very similar whether death is directly attributed to intestinal obstruction or the operation has been complicated by peritonitis. Experiments to determine the part played by the nervous factor in intestinal obstruction involve inserting a foreign body into the intestinal lumen so that it can be artificially inflated. Ascroft and Lloyd Davies [2] have devised a method in which the loop of bowel to be inflated is severed from the main intestinal tube retaining its mesenteric connexions. Cats were used for the experiments. The isolated loop was transplanted beneath the skin of the abdominal wall, with each

[1] Corper, H. J., Cohn, M. L., Simpson, M. G., and Bower, C., *Amer. Rev. Tuberc.* December, 1937, p. 763.
[2] Ascroft, P. B., and Davies, O. V. Ll., *J. Physiol.* 1937, **91**, 16P.

end open as a colostomy. The continuity of the bowel was restored and the animals allowed to recover from the operation. Thus the introduction of foreign bodies into the loop did not involve interference with the peritoneum. It was found that tight distension of the bowel wall caused none of the symptoms of shock or collapse associated with intestinal obstruction, despite the fact that the vascular and nervous connexions were intact. A piece of thin-walled rubber tubing was inserted into the lumen of the loop and inflated with water at a pressure varying from 135 to 210 mm. Hg. The distension was not released for from 3 to 18 days. The animals showed neither discomfort nor general symptoms. The contrast between the results of this and a previous set of experiments by Taylor, Weld, and Harrison [3] is interesting. They introduced a rubber bag attached to a firm rubber tube directly into the lumen of the normal bowel. The stout tubing preserved the lumen from complete obstruction while the bag was distended to a pressure of 60–110 mm. Hg. The dogs in which this was done became acutely ill and died within 24 hours with the symptoms of intestinal obstruction. It may, of course, be that the soiling of the peritoneum in Taylor's dogs complicated the issue. It seems more likely that the distension of the bowel wall, and the consequent interruption of peristalsis, may cause nervous or toxic disturbances in the gut wall which are not produced in an isolated loop. Taylor repeated his experiments on intestine that had been denervated. The animals lived longer, but they died of peritonitis.

PATHOGENESIS AND TREATMENT OF ANGINA

BEFORE 1924 myocardial infarction was hardly ever diagnosed clinically in this country; to-day, however, the error is probably in the other direction and it is diagnosed too often. There is still much that is obscure in the pathogenesis of anginal pain. Two interesting problems are the part played by coronary spasm, and the exact pathogenesis of severe anginal pains that have no apparent exciting cause, yet are not associated with evidence of infarction. In a discussion of angina apart from myocardial infarction, Hochrein [4] still characterises this pain as radiating down the left arm and as being associated with a sense of impending death, though both these features are absent in a large number of cases. Besides disagreeing with Anrep's experimental finding that with increase in systolic output there is a diminution in the coronary flow during systole, he seems to have misinterpreted Anrep's finding that in the innervated preparation the coronary flow per minute varies directly with the cardiac output. He discusses the part played by mechanical, chemical, hormonal, and nervous factors in the control of the coronary flow. Our knowledge of these factors derived from laboratory experiments cannot, however, be applied to the individual with angina for two reasons: first, the reactions of the arteries to the heart vary remarkably from one species to another; secondly, it has been shown that a diseased artery may react in the reverse way to a normal one.[5] Hochrein draws attention to the frequency of severe coronary disease in subjects who have never had cardiac pain, and it is generally agreed that the enormous variation in the sensitivity of the nervous system in different persons accounts in large part for this. In the differential diagnosis between angina and the type of chest pain met with in abnormal states of the nervous system, he believes that in the absence of organic heart disease the electrocardiogram is helpful. He says that immediately after exercise the anginal curve shows changes that are absent in the other type of pain. It is true that when an anginal subject takes exercise pain may arise and that this may be accompanied by temporary changes in the electrocardiogram, but the association is not constant enough to make a useful diagnostic test. The interrogation of the patient thus remains the most important step in the diagnosis of cardiac pain.

Turning to the treatment of angina, Hochrein condemns nitrites as the "morphia of the heart with all its disadvantages"—an unfortunate comparison, since morphine is one of the most valuable remedies in heart disease. It is contended that although nitrites may have a momentarily favourable effect they do ultimate harm, the attacks being rendered more frequent and severe. Unpleasant after-effects, such as mental numbness, giddiness, constipation, and cramps, are also held to be an important drawback. It is however surprising, if these drugs are of so little value in giving relief and so liable to produce unpleasant symptoms, that there should be any risk of the formation of a nitrite habit. Clinical experiments on the effect of nitrites in relieving effort angina have recently been reported by Riseman and Brown.[6] They induced attacks in their patients and determined the total duration of pain with the patient at rest but without medication. On a subsequent day the test was repeated, but a nitrite preparation was given at the onset of the pain. As would be expected, in patients whose pain usually passed off quickly with rest alone, the nitrite had little effect; in those liable to longer attacks the beneficial effect of the vasodilator was evident.

PREMATURELY AGED EX-SERVICE MEN

THE average age of ex-Service men is now 48, and each year an increasing number reach a time of life when they can no longer earn a living. The national insurance scheme assume that the average working man retires and needs his pension at 65, but the British Legion conference of 1936 suggested that the nervous strain and privations of war so affected those who served in it that, apart from actual disablement, they were likely to become unfit for work at an earlier age. A committee which the Legion set up to study this problem found that medical opinion was divided on whether soldiers were more likely to have been harmed by nervous strain or benefited by good food, fresh air, and regular exercise. Neither the approved societies nor the Ministry of Health were able to provide conclusive evidence, and it proved impracticable to make a medical survey of representative groups of ex-Service men and non-combatants. From a consideration of individual cases, however, the committee has no doubt that many men are prematurely old because of the intangible effects of the war. On the basis of figures supplied by local authorities it calculates that in the whole country there are about 18,000 ex-Service men between 40 and 60 who are chronically sick and compelled to apply for public assistance, and a further 25,000 under treatment at municipal hospitals. The Legion's own records show that an additional 50,000 are managing with difficulty to dispense with public assistance. Many ex-Service men regard help

[3] Taylor, N. B., Weld, C. B., and Harrison, G. K., *Canad. med. Ass. J.* 1933, **29**, 227.
[4] Hochrein, M., *Med. Klinik*, 1937, **33**, 1385.
[5] Anrep, G. V., Lane Medical Lectures, 1936, p. 94.
[6] Riseman, J. E. F., and Brown, M. G., *New Engl. J. Med.* 1937, **217**, 470.

from the "poor-law" as degrading and conveying a stigma of pauperism; they feel—and the committee supports them—that when they are in need and not catered for by a pension, by insurance, or otherwise, they should not have to apply for public assistance but should be a State charge.

THE NEW GUY'S

THE familiar quadrangle and façade of Guy's Hospital are threatened with demolition. The surgical block that lies behind them has been in existence with but little alteration since 1725, and the hospital authorities think it quite unsuited to modern requirements. The alternatives are to do away with all the remaining old buildings and erect an entirely new block, or to retain the façade and make new surgical wards behind it. The present entrance to the hospital has a quiet dignity and beauty that it would be difficult for a modern structure to emulate, and Guy's men feel that if it disappears something of the tradition that binds successive generations will go with it. If sentiment were the only consideration the second alternative would be the obvious choice, but a modern hospital, if it is to meet the increasing demands on its services, must put the claims of efficiency before those of architectural charm or even of tradition. The present surgical block covers an area of 250 by 150 feet and it is doubtful whether this will provide enough space for the present and future needs of the surgical wards unless the quadrangle is included. Moreover, defects in the walls and foundations of the chapel and the adjacent buildings may, it appears, already be imperilling their existence. The hospital architect, Mr. W. J. Walford, has drawn up a tentative plan for rebuilding which most but not all of the governors have approved. Fortunately, perhaps, the problem is not one that must be solved immediately, for the fulfilment of either scheme depends upon raising the necessary capital, some £500,000; and while this is being done some compromise may present itself that will be both surgically and æsthetically satisfying.

THE AGE OF LIBRARIES

ON Nov. 16th, 1936, the American Army Medical Library entered upon its second century of inestimable service to the medical and bibliographical world. Originating in a few works of reference for the private use of Surgeon-General Joseph Lovell, the collection grew under the care of its first great librarian, Colonel John Shaw Billings, slowly at first, then more rapidly into what is now the finest and most comprehensive medical library in the world, housing close on a million volumes and employing a staff of thirty. Since 1880, it has been responsible for the publication of the Surgeon-General's Index Catalogue in four series and, as a sort of monthly supplement, the invaluable "Index Medicus," now amalgamated with the Quarterly Cumulative Index.

A commemorative volume [1] has been issued in the form of a collection of articles reprinted from the *Military Surgeon* for January, 1937, and from the December, 1936, issue of *Medical Life*, bound together into one slim volume of some 130 pages. There is no introduction, nor is the pagination consecutive; and one's disappointment increases on finding that nearly all the articles are duplicated in the two sections. Among them are some charming ones, notably the report of Sir Humphry Rolleston's commemorative oration.[2] On the occasion of its delivery he was presented with a diploma appointing him consultant to the Army Medical Library. The history of medical book illustration from the twelfth to the twentieth century is outlined by C. F. Mayer, assistant librarian; and Major E. E. Hume, late librarian, describes the "Buildings for the Army Medical Library." The present librarian, Colonel H. W. Jones, gives accounts of the centenary celebrations and of the tributes received from some 200 institutions and distinguished men representing 45 different countries. Even if the commemorative volume is not entirely worthy of its subject, it will be valued for its historical account of one of the great treasures of the medical and bibliographical world.

[1] The One Hundredth Anniversary of the Army Medical Library. A symposium by various authors. Washington, D.C. Pp. 124.

[2] See also *Lancet*, 1936, **2**, 1286.

EDUCATING OUR MASTERS

THE lack of confidence in doctors now displayed by the public is often deplored, but seldom so vigorously as by Dr. A. H. Douthwaite in his presidential address to the Harveian Society of London last week. Dr. Douthwaite had much to say about the follies of patients, especially rich ones, and regretted the "complete severance of the masses from logical thought." He did, however, end by admitting that the profession should be more ready to descend from its olympian heights. "We can't blame patients for disregarding our conventions if they don't know of their existence," and he had been credibly informed that the public as a whole has no idea that a general practitioner should be approached before going to a consultant. It may be asked, said Dr. Douthwaite, who is going to make himself responsible for the dissemination of medical truths. The campaign must in his opinion be in the hands of a body aloof from medical politics, and the General Medical Council would serve the purpose if it could obtain the necessary powers. (To enlist the sympathy of the public and the press has certainly not been the primary purpose of the council hitherto; whereas the British Medical Association has taken definite steps to do so.) On the whole, however, Dr. Douthwaite would prefer to see the task in the hands of younger men, and he hinted at the possibility of securing financial aid from bodies such as insurance companies which stand to lose from the self-treatment, or inefficient treatment, of disease.

THE 25 members of the General Nursing Council elected or appointed for the next five years include 4 members of the medical profession, Dr. M. A. Collins, Dr. Geoffrey Evans, Dr. M. H. Kettle, and Sir Frederick Menzies, all of whom are appointed by the Minister of Health.

INDEX TO "THE LANCET," VOL. II, 1937

THE Index and Title-page to Vol. II, 1937, which was completed with the issue of Dec. 25th, will be ready next week. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam-street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

WESTMINSTER HOSPITAL.—A portion of the new Westminster Hospital now being erected on the St. John's Garden site is to be called the Coronation wing, and the King has consented that the first ward shall be named the King George VI ward, and the second the Queen Elizabeth ward. The wing will constitute a complete medical unit, with 25 beds, a clinical laboratory, and ancillary service rooms.

SPECIAL ARTICLES

EARLY DIAGNOSIS AND PROGNOSIS OF LOBAR PNEUMONIA IN RELATION TO SERUM THERAPY*

BY ROBERT CRUICKSHANK, M.D. Aberd., D.P.H.

PATHOLOGIST TO THE LONDON COUNTY COUNCIL GROUP LABORATORY, NORTH-WESTERN HOSPITAL; AND

JAMES A. MONTGOMERY, M.D. Glasg.

RESIDENT MEDICAL OFFICER AT THE HORNSEY, FINCHLEY, AND WOOD GREEN ISOLATION HOSPITAL

IF the therapeutic value of specific antiserum in the treatment of lobar pneumonia is admitted—and Cecil (1937) has pointed out that no paper has been published to contradict the many good reports on serum therapy—it may be asked why its use is not more general in this country. Some of the obstacles as outlined by Ryle and Waterfield (1933) are the delay in clinical and bacteriological diagnosis, the problem of deciding which patient really requires serum, since four out of five normally recover, and the difficulty and dangers of intravenous therapy. The last of these obstacles may usually be overcome by experience and adequate precautions so that there remain to be answered two questions: how to recognise *early* the case of pneumonia suitable for serum therapy and how to decide whether it is desirable to give serum to such a case. If we agree with Ryle that serum should be reserved for the patient who is likely to do badly, then to quote Davies, Hodgson, and Whitby (1935), "it would be a great gain in practical therapeutics if patients ... who need specific therapy to realize a crisis could be readily distinguished from those who come safely through without any specific measures." The purpose of the present paper is to describe the results obtained with two easily performed tests which help materially in the early diagnosis and prognosis of lobar pneumonia.

EARLIER METHODS FOR THE RAPID DETERMINATION OF PNEUMOCOCCUS TYPE

Several methods for the rapid determination of pneumococcus type in the sputum of patients with lobar pneumonia have from time to time been described (Krumwiede and Noble 1918, Avery 1918, Sabin 1929).

The first of these methods depends in essence on extracting the specific pneumococcus substance by boiling 5–10 ml. of sputum, breaking up the coagulum, adding a small amount of saline, centrifuging, and testing the clear supernatant fluid for precipitinogen by layering it on top of small amounts of the various type antisera in agglutination tubes. Results may be obtained in 15–30 minutes, but owing to the scantiness of sputum it is often impossible to carry out the test in the early stages of a pneumonia. Cecil and Plummer (1932) obtained positive results in 23 out of 28 patients, who in a series of 58 type II pneumococcal infections provided enough tenacious sputum to allow the test to be done.

In the same year, owing to the shortage of white mice at the time, Avery devised a test-tube method for rapid pneumococcus typing. A kernel of sputum, free of saliva, washed in saline and ground in a mortar is added to 4 ml. of glucose-blood-broth in a centrifuge tube and the mixture incubated for 5 hours. The broth is then lightly spun and the supernatant suspension of organisms is tested for agglutinability with types I, II, and III pneumococcus agglutinating sera or for the precipitation reaction after addition of bile to dissolve the pneumococci. In 60 cases Avery found agreement between the cultural and mouse inoculation methods in all save 3 type I infections where the sputum had not been washed free of mouth contaminants. This method could be usefully modified to-day to the rapid determination of pneumococcus type in the pneumonias of children.

The Sabin method requires the inoculation of sputum into a mouse from which peritoneal exudate is withdrawn some 4–6 hours later, a procedure first described by Avery in 1918. If pneumococci are numerously present, the exudate is tested for agglutinability by placing three drops on a slide and adding to the first drop a loopful of type I pneumococcus agglutinating antiserum, to the second type II and to the third type III antiserum. Agglutination may usually be seen naked-eye by a coarse granularity in one of the three mixtures or may be demonstrated microscopically by staining the dried preparation with dilute carbol-fuchsin. The peritoneal exudate is similarly examined when the mouse dies, usually 12–24 hours after inoculation.

The main disadvantage of Sabin's method is that it requires a licensed animal-house, a supply of suitable animals, and a licence-holder; but in spite of these drawbacks the mouse method of pneumococcus typing from sputum is, we believe, still the most reliable and should be used whenever possible as a confirmatory test to any other method.

PNEUMOCOCCUS TYPING BY THE DIRECT NEUFELD METHOD

The method which in recent years has attracted most attention is one which depends on a phenomenon first described by Neufeld in 1902. Neufeld observed that when a strongly acting antiserum was brought into contact with a broth culture of pneumococcus (one loopful of each on a cover-slip) there occurred swelling (*quellung*) of the individual cocci to two or three times their original size. "Sometimes it is clear that the linings of the bacterial cells take part in the swelling process. They change into a homogeneous, glassy mass while in the middle a dark round nucleus is to be seen." The swelling was seen only with undiluted serum: if the serum was used in a dilution of 1 : 4 or 1 : 8 agglutination only of the cocci occurred. Neufeld also remarked that the cocci in this swollen state seemed to have lost their staining capacity when dried and fixed in the ordinary way, but if stain were added to the wet preparation the central nucleus took up the dye while the swollen masses remained unstained. This phenomenon was being utilised in Neufeld's laboratory in 1930 for the serological typing of pneumococcus in experiments with animal carriers when it was demonstrated to one of us (R. C.) by Miss Etinger-Tulczynska, but although its use was suggested by Neufeld and Etinger-Tulczynska (1931) they had not tried it in cases of lobar pneumonia.

Armstrong (1931) was perhaps the first to apply the method to the identification of pneumococcus types from the sputa of patients with lobar pneumonia when he showed that with agglutinating rabbit sera the Neufeld phenomenon could be demonstrated with the peritoneal exudate of mice withdrawn a few hours after injection of the sputum. In the following year

* The work on which this paper is based was done in the pathology department of the Royal Infirmary, Glasgow, and we are especially indebted to Mr. J. L. Herrick for technical assistance. The material came from Belvidere Isolation Hospital, Glasgow, and we would thank Dr. T. Archibald, medical superintendent, for permission to utilise it, and Sister Murray for valuable assistance in collecting it.

Armstrong (1932) and Logan and Smeall (1932) independently applied the Neufeld phenomenon to the immediate typing of pneumococcus from sputum. The latter workers stressed the possible fallacies of the method in the hands of an inexperienced microscopist—e.g., mistaking yeasts or starch granules for swollen pneumococci or confusing a type III pneumococcus in its normal state with a swollen type I or II organism. Since then, this method has been adopted enthusiastically in America where various workers have reported the results obtained with or without modifications in the original technique. Sabin (1933), for example, stated that agglutinating *rabbit* sera should be used since sera prepared from the *horse* sometimes gave non-specific reactions, that the sputum should be typed not later than 1–2 hours after being coughed up, and that alkaline methylene-blue, as used in Neufeld's laboratory, should be added to demarcate the pneumococcus cell. Most workers (e.g., Neufeld and Etinger-Tulczynska 1931, Bullowa 1935, Park 1935) seem to agree on the advisability of using rabbit rather than horse agglutinating sera. Beckler and MacLeod (1934) extended the Neufeld method of pneumococcus typing, previously used only for types I, II, and III, to the determination of Cooper's other 29 specific types of pneumococcus. Their results for types I, II, and III show a remarkable accuracy and a high proportion of positive reports when compared with the mouse and other methods of typing: of 246 sputa 135 were diagnosed type I by the Neufeld technique and 94 per cent. of these were corroborated by other methods; 29 were similarly diagnosed type II and all were checked; while 98 per cent. of 82 specimens diagnosed type III were corroborated. They were able to give to the physician an immediate correct report on 89 per cent. of all types I and II cases of pneumococcal pneumonia from which sputum was sent for examination. Bullowa reported 76 per cent. positive results by the Neufeld method in 100 consecutive cases and remarked on the possibility of typing from old specimens of sputum. Vinograd, Nemir, and Park (1936) applied the method to children, again with all of Cooper's 32 types, by washing in broth a swab from the back of the throat, centrifuging, and mixing a loopful of the deposit with the agglutinating sera: 76 positive Neufeld typings were confirmed by mouse inoculation; 7 positive Neufeld results were not confirmed from the mouse; while 6 positive mouse results were negative by the Neufeld technique.

Thus the American work has shown that the Neufeld method gives 75–90 per cent. correct reports in pneumonias due to all types of the pneumococcus.

METHODS AND MATERIAL IN THE PRESENT INVESTIGATION

Specimens of sputum were collected from male patients suffering from lobar pneumonia, usually on the first or second day after admission to hospital. The average duration of illness of these patients on admission was 3·6 days. In certain cases specimens were examined from patients after the critical fall of temperature, and there were a few specimens from patients with broncho-pneumonia and bronchitis, although as a rule frankly purulent sputa were not examined. In every case the specimen used for immediate typing was injected into a mouse and serological typing carried out 6 hours afterwards by withdrawal of peritoneal exudate or after death of the mouse. It was the rule to have several specimens for mouse-typing from each patient during the course of his illness so that the initial type-determination could be corroborated.

The sera used were the agglutinating antisera supplied by Burroughs Wellcome and Co. for types I and II pneumococci, and a similar serum supplied by Mulford (Sharp and Dohme) for type III pneumococcus. These sera were prepared in the *horse*, and when mixed on a slide in dilutions of 1 : 10 and sometimes 1 : 20 with mouse peritoneal exudate immediately agglutinated the homologous pneumococcus. The titres of the types I and II sera when tested macroscopically in the water bath at 55° C. against suspensions of pneumococci varied from 1 : 64–1 : 128, and our experience that good titre horse sera give reliable Neufeld readings has been confirmed by Whitby (1937).

For the test proper these sera were diluted 1 in 5 and several loopfuls of type I antiserum were intimately mixed at one end of the slide with a loopful of sputum (amounting in actual volume to approximately twice that of the added serum); at the other end the same procedure was carried out with a type II antiserum: cover-slips were placed on top and ringed with Vaseline and the preparations were examined under the oil-immersion lens with the light dimmed. If no immediate diagnosis could be given, the specimens were left and re-examined after 10–15 minutes or as late as half an hour.

The characteristic *quellung* has now been frequently described: the striking features are the "ballooned" appearance of the diplococcus, the apparently swollen capsule being rather opaque, greenish-grey in colour, and much more definite in outline than the scarcely distinguishable translucent capsule of the unaffected organism. There is no doubt that a certain amount of experience and often a considerable degree of patience are required for a high proportion of successes, particularly if the organisms are scantily present. We did not as a rule add any stain, although for demonstration purposes the addition of a drop of alkaline methylene-blue helps to locate the pneumococci, while for a permanent preparation Valentine's (1933) method or the modification suggested by Clark (1933) gives good results.

Contrary to Sabin's experience, freshness of the specimen is not essential: for example, positive results were obtained with specimens of sputum kept on the bench for 5–6 days even after the organisms were apparently dead as tested by mouse inoculation of the sputum. The main cause of failure in immediate Neufeld typing is the paucity of the specific pneumococcus, more particularly if other organisms are numerously present. May we say here that every effort should be made to obtain adequate specimens of sputum by propping up the patient and encouraging him to cough up material from the bronchi; attempts to collect sputum from a patient in the recumbent position, particularly in the early stages when exudate is scanty, usually result in a purely salivary specimen.

TABLE SHOWING DIRECT (NEUFELD) PNEUMOCOCCUS TYPING FROM SPUTUM

189 specimens: "direct" and "mouse" typing agreed in 151=80 per cent.

	Mouse.	Direct.	Per cent. agreement.
Type I	29	23	79·3
,, II	77	60	77·9
,, III	5	2	—
Group IV	78	66	84·6
Types I & II	102 (corrected)	83	*81·3*

RESULTS OF NEUFELD TYPING

The uncorrected results are shown in the accompanying Table, where it will be noted that of 189 specimens of sputum examined there was agreement

between the mouse and direct typing in 151, or 80 per cent. There were 23 failures of immediate typing out of 106 sputa containing types I and II pneumococci as determined by the mouse method, and when these were analysed it was found that 3 of the specimens were from convalescent patients while a fourth was the last specimen of sputum from a patient with group IV pneumococcus pneumonia. All the others except 3 were specimens taken on the day after admission, so that failure to identify the type I or II pneumococcus by the direct method was most probably due to scantiness of the pneumococci. If the 4 specimens from convalescent patients are omitted, the proportion of correct diagnoses by the Neufeld method in types I and II pneumococcal pneumonias is 83 out of 102, or 81·3 per cent. In other words, if all these patients had been considered suitable for serum therapy, specific treatment would have been deferred for 6–18 hours in only one-fifth of the cases until a type diagnosis was obtained by the mouse method.

More disturbing at first sight were the 12 specimens from which group IV pneumococci were recovered by mouse-inoculation, whereas the presence of type I, II, or III was diagnosed or suspected by the direct method of examination. Occasional discrepancies in this direction between the direct and mouse methods of typing may be expected, since type I or II pneumococci scantily present in a sputum containing numerous group IV organisms may be detected by the Neufeld technique but overwhelmed in the mouse peritoneal cavity. Most workers have had experience of two or more pneumococcal types being present in a sputum simultaneously. Analysis of the present series showed that the results were not as bad as they looked. For example, one of five patients in whose sputa type I pneumococci were recorded by the Neufeld test proved, by subsequent examination and by a dramatic response to serum treatment, to be a type I infection; another from whom only one specimen of sputum was obtained might also from the clinical history have been a type I pneumococcal pneumonia. In two patients the diagnosis from direct typing was type II pneumococcus and this type diagnosis was confirmed in one by direct and mouse examination of a second specimen of sputum. Of the remaining five, two were reported "? type I," one as "? type II," and two as "? type III" by the Neufeld method, but these types were not recovered by mouse-inoculation. Thus discounting the query diagnoses and the two cases which later proved to be due to the type suggested by the Neufeld method, there remained 5 patients out of 78, or 6·4 per cent., who, if serum were being exhibited on the results of the direct examination, would have been wastefully given at least one dose of antipneumococcal serum. On the other hand, serum would have been wrongly withheld in two cases for 2–3 days had the mouse method alone been relied on for type diagnosis.

URINARY PRECIPITATION TEST

In 1917 Dochez and Avery reported the excretion of a specific substance in the urine of patients with types I, II, and III lobar pneumonia, and one of us has lately published the first corroborative findings (Cruickshank 1938). It is our intention here to assess the value which the demonstration of these specific substances has in the early diagnosis and prognosis of lobar pneumonia. Now known to be polysaccharides which are intimately associated with the pneumococcus capsule, they are readily detected by a precipitation reaction between the urine and the type-specific pneumococcal antisera.

Phosphates are first deposited by adding 4–5 drops of N/1 NaOH to 5 ml. of urine in a centrifuge tube and spinning until the supernatant fluid is clear. On top of 0·3 ml. of this urine in each of three Dreyer's agglutination tubes is layered 0·2 ml. of a 1 in 5 dilution of type I antipneumococcal serum (to the first tube), 0·2 ml. of type II antiserum (to the second tube), and 0·2 ml. of type III antiserum (to the third tube). The tubes are immediately examined in a good light for a white ring at the junction of the fluids and re-examined for a deposit after standing on the bench for four hours, the amount of deposit being recorded as +, ++, or +++.

In the examination of over a thousand specimens from 200 patients the test has proved to be absolutely specific.

Diagnosis.—Although 96 out of 154 patients, or 62·3 per cent., suffering from type I, II, or III pneumococcal pneumonia had demonstrable specific substance in their urine at some stage of infection or convalescence, the test was positive in the first specimen, taken on the morning after admission, of only 64 patients, or 41·5 per cent.—viz., in 9 out of 44 type I pneumococcal pneumonias, in 53 out of 103 type II infections, and in 2 out of 5 type III cases. Thus only a fifth of the type I and half of the type II pneumonias could, on admission to hospital, be serologically typed by this method. The test is therefore not to be relied upon as a method for early diagnosis, but is rather a useful confirmatory test especially in type II infections. It may also on occasion identify the infecting pneumococcus type when other methods fail. A few examples may be cited.

A patient, aged 24, died 5 days after admission: sputum could not be obtained but urinary specimens on the second, third, and fifth days after admission gave respectively ++, ++, and +++ precipitates with type II pneumococcus antiserum. Autopsy was refused but a post-mortem lung-puncture gave a culture of type II pneumococcus.

Another patient, aged 40, died on his third day in hospital: on the morning of his death a meagre specimen of sputum was obtained from which a ? type II pneumococcus was isolated by mouse-inoculation. A urinary specimen on the previous day gave a strongly positive type II precipitation reaction.

From the sputum of a third patient, aged 45, whose temperature was settling on admission, type I pneumococcus was repeatedly isolated. The patient had pulmonary phthisis and it was thought that the signs in the lung were due to the tuberculous infection and not to a resolving pneumonia. However, his urine on the first, third, and fifth days after admission gave +++, +++, and + precipitates with type I antiserum, and the diagnosis was altered from tuberculous broncho-pneumonia to resolving lobar pneumonia and pulmonary phthisis.

The test has also confirmed the clinical diagnosis of reinfections occurring in the wards. For example, two patients with lobar pneumonia had group IV pneumococci in their sputa for two weeks; then type II pneumococcus appeared coincident with a rise of temperature. The occurrence of type II pneumococcus in the sputum of a convalescent patient in the pneumonia ward might have been due to a temporary carrier state, but the urinary specimens which for two weeks had given negative reactions with types I, II, and III pneumococcus antisera now gave precipitates with the type II serum. Pleural fluids and other exudates suspected of being pneumococcal have also been tested for specific

polysaccharide by this method and a diagnosis of type has sometimes been given when the causal organism could not be recovered from the fluid.

The *prognosis* of lobar pneumonia is difficult. The factors to which we have learnt to attach importance in an otherwise healthy individual are the age of the patient, the serological type of the infecting pneumococcus, the leucocyte response, and the presence or absence of bacteræmia. Blood culture may be discounted since it requires special laboratory facilities and the lapse of 24 hours before the result is known; besides, a single blood culture early in the infection is a much less reliable prognostic guide than a leucocyte count (Cruickshank 1933, Davies and others 1935). A single leucocyte count may also be misleading: an initial low count may rise as the disease progresses and vice versa. Knowledge of the infecting type in lobar pneumonia is possibly of more prognostic value than to know that a case of enterica is due to the typhoid or paratyphoid bacillus or that the Flexner or Shiga organism is the cause of a particular case of dysentery, since at all ages the mortality from type II infection is greater than that in type I pneumonia (Cruickshank 1933). And, of course, increasing age has long been known to affect the mortality-rate of lobar pneumonia. But in spite of this knowledge, the physician is often unable to say how a particular patient with lobar pneumonia is likely to progress, or, knowing that the infecting organism is type I or II pneumococcus, to decide whether or not to give the patient serum. The urinary precipitation test should help him to make up his mind. If only the admission specimen of urine in cases with types I and II pneumococcal pneumonia is considered, there were in our series 62 patients with positive reactions of whom 24 died (= 38·7 per cent.), while 85 patients had negative initial tests of whom 2 died (= 2·3 per cent.). Of the latter two patients, A. B., aged 18, type I, had increasingly positive specimens on the third, fifth, and seventh days and died on his eighth day in hospital. From the other patient, C. D., aged 36, type II, only one specimen of urine was obtained and it gave a doubtful positive reaction.

If all the specimens tested are considered, the reaction was positive in 94 patients of whom 25, or 26·6 per cent., died and negative in 53 patients of whom only 1, or 1·9 per cent., died. The case death-rate was 17·6 per cent. Thus it seems fair to state that a positive reaction with the first specimen of urine in a case of lobar pneumonia due to type I or II pneumococcus justifies a grave prognosis since two-fifths of such patients die, whereas a negative test, and more especially if it continues negative, calls for a very reassuring report. The outlook is especially grave if the first specimen gives a "3 plus" precipitate. As for serum therapy, we suggest that unless there are definite contra-indications every patient whose first urinary specimen contains demonstrable specific pneumococcus polysaccharide should have the benefit of serum. If the precipitation test is negative, there is no indication for giving serum to save life, although it may at the physician's discretion be used to abort the infection. The dosage of serum could probably be graded in accordance with the result of the test: small doses would suffice if the test were negative and larger doses should be given according to the amount of precipitate in a positive reaction.

It must occasionally happen that a patient with lobar pneumonia dies from other causes than the pneumococcal infection; but the fact that in our series only 1 patient died—and he with a "?positive" reaction—out of 53 whose urinary precipitation tests were persistently negative, indicates that the pneumococcal toxæmia is almost always an important contributory factor in a fatal termination. In saying this, we make what seems a justifiable assumption that the excretion of the pneumococcus polysaccharide in the urine is an indication of the severity of the pneumococcal toxæmia. This assumption is supported by the finding of a greater incidence of positive urinary precipitation tests among patients over 35 years compared with those under 35, and in type II compared with type I pneumococcal infections, a finding which is correlated with a higher case-fatality in these groups (Cruickshank 1938). A close relationship between precipitation reaction and severity of infection has been recently demonstrated in another disease—viz., cerebro-spinal fever in which the test has been used diagnostically for some time. Alexander (1937) has shown that if the cerebro-spinal fluid, after centrifugation, is layered on top of the type-specific sera, appearance of the precipitation ring *within 10 minutes* indicates a grave prognosis, since among 69 patients 77 per cent. died in which this happened and only 4 per cent. where the test was negative.

SUMMARY

For the proper and effective treatment of lobar pneumonia with type-specific antisera, the physician must know the infecting pneumococcus type and assess the severity of the infection as early as possible. By the Neufeld method of direct pneumococcus typing, American workers using agglutinating *rabbit* sera have had 75–90 per cent. successes not only with types I and II pneumococci but also with other types for which therapeutic sera are now available. In the present investigation, with agglutinating *horse* sera, the type diagnosis has been made by the Neufeld method in over 80 per cent. of 102 patients with type I or II pneumococcal pneumonia. Although the infecting type has occasionally been identified by direct typing and missed by the mouse-inoculation method, the latter procedure should wherever possible be used to corroborate and check type diagnosis by the Neufeld technique.

The prognosis of lobar pneumonia is difficult and in deciding whether a patient requires specific serum therapy, the physician has usually taken into consideration a combination of such factors as age of patient, infecting pneumococcus type, leucocyte count, and blood culture, although no one of these factors is by itself a reliable guide. The presence of the specific pneumococcus polysaccharide in the urine—readily demonstrable by a precipitation reaction—during the early stages of infection is recommended as a valuable prognostic criterion. Of 62 patients who on admission gave a positive urinary precipitation test 24 died, or 38·7 per cent., whereas out of 53 patients with persistently negative tests only 1 died, or 1·9 per cent. It is therefore suggested that in the absence of definite contra-indications, a patient with lobar pneumonia whose early urinary specimens contain pneumococcus polysaccharide is a suitable case for serum therapy.

REFERENCES

Alexander, H. E. (1937) *J. clin. Invest.* **16**, 207.
Armstrong, R. R. (1931) *Brit. med. J.* **1**, 214.
— (1932) *Ibid*, **1**, 187.
Avery, O. T. (1918) *J. Amer. med. Ass.* **70**, 17.
Beckler, E., and MacLeod, P. (1934) *J. clin. Invest.* **13**, 901.
Bullowa, J. G. M. (1935) *J. Amer. med. Ass.* **105**, 1512.
Cecil, R. L. (1937) *Ibid*, **108**, 689.
— and Plummer, N. (1932) *Ibid*, **98**, 779.
Clark, W. H. (1933) *Laboratory J.* **7**, 126.
Cruickshank, R. (1933) *Lancet*, **1**, 563, 621.
— (1938) *J. Path. Bact.* **46**, 67.

(*Continued at foot of next page*)

STANDARDISATION OF PRECORDIAL LEADS

JOINT RECOMMENDATIONS OF THE CARDIAC SOCIETY OF GREAT BRITAIN AND IRELAND AND THE AMERICAN HEART ASSOCIATION

In the last few years electrocardiographic leads in which an electrode placed upon the precordia is paired with an electrode in contact with some part of the body distant from the heart have come into widespread use. The confusion which has resulted from the lack of uniformity and precision in the technique and nomenclature employed by different observers in connexion with leads of this kind has led to an almost universal desire that a standard practice be established. To this end the Cardiac Society of Great Britain and Ireland and the American Heart Association have each appointed a committee to consider this matter and make recommendations. The two committees have conferred and have agreed jointly to make recommendations with reference to the routine use of a single precordial lead. It is understood that either committee may make additional reports with reference to multiple precordial leads and other matters not dealt with in the present report.

THE PROPOSALS

1. It is recommended that those who employ a single precordial lead place the precordial electrode upon the extreme outer border of the apex-beat, as determined by palpation. If the apex-beat cannot be located satisfactorily by palpation the electrode may be placed in the fifth intercostal space just outside the left border of cardiac dullness, or just outside the left midclavicular line if percussion of the heart is unsatisfactory. Where precordial leads are taken by a technical assistant, the position for the precordial electrode should be marked on the chest by the physician.

2. It is recommended that a single precordial lead in which the precordial electrode has the location specified in the preceding paragraph be known as lead IV when this electrode is paired with an electrode in the left interscapular region; lead IV R when it is paired with an electrode on the right arm; lead IV L when it is paired with an electrode on the left arm; lead IV F when it is paired with an electrode on the left leg; and lead IV T when it is paired with a central terminal connected through equal resistances of 5000 or more ohms to electrodes on each of the three extremities mentioned.

It is suggested that *for all ordinary purposes lead IV R or lead IV F should be employed.* The latter lead should have the preference until it has been established that the former, which is somewhat more convenient, is equivalent to the latter for all practical purposes, or yields results of equal value.

3. It is recommended that in taking the precordial leads specified the galvanometer connexions be made in such a way that relative positivity of the apical electrode is represented in the finished curve by an upward deflection (a deflection above the isopotential level) and relative negativity of the apical electrode by a downward deflection.

It is urged that this convention be adhered to in the case of precordial leads other than those specified, and also in the case of all leads in which one electrode is placed much closer to the heart than the other. In other words, it shall be the standard convention in taking such leads to make the galvanometer connexions in such a way that relative positivity of the electrode nearer the heart is represented by an upward deflection.

4. It is recommended that with the galvanometer connexions made as described in the preceding paragraph, the deflections of precordial leads be designated by the symbols P, Q, R, S, and T, and that in the application of these symbols the same conventions be employed as in the case of the standard limb leads.

5. It is recommended that in taking precordial leads the electrocardiograph be so adjusted that a deflection of 1 cm. in the finished record corresponds to a potential difference of one millivolt as in the case of the standard limb leads. Any reduction in sensitivity made necessary by very large deflections should be clearly indicated on the curve preferably by photographing the effect of introducing a potential difference of 1 mv. into the galvanometer circuit.

6. It is recommended that the greatest dimension of the apical electrode employed in taking the leads specified in this report be 3 cm. or less. A circular electrode between 2 cm. and 3 cm. in diameter should ordinarily be employed.

7. It is recommended that the terms lead IV (R, F, &c.), apical lead, apex-leg lead, &c., be used henceforth only in connexion with the leads specified in this report.

THE TWO COMMITTEES

The above recommendations have been drawn up by the following two committees, working in coöperation:—

Committee of the Cardiac Society of Great Britain and Ireland.—D. Evan Bedford, John Parkinson, and P. H. Wood (London); John Cowan (Glasgow); A. N. Drury (Cambridge); and I. G. W. Hill (Edinburgh).

Committee of the American Heart Association.—Arlie R. Barnes (Rochester); Harold E. B. Pardee (New York); Paul D. White (Boston); Frank N. Wilson (Ann Arbor); and Charles C. Wolferth (Philadelphia).

The joint recommendations have been approved by the council of the Cardiac Society and by the American Heart Association, who now authorise their publication. The following addendum to the joint report has been made by the Cardiac Society.

ADDENDUM

1. The above report deals with the nomenclature and technique for obtaining a single precordial lead suitable for routine clinical work. The subcommittee of the Cardiac Society had insufficient evidence available to permit their making recommendations in respect of multiple precordial leads. The American Heart Association will, however, draw up such recommendations, and, when published, copies of these

(*References continued from previous page*)

Davies, D. T., Hodgson, H. G., and Whitby, L. E. H. (1935) *Lancet*, **1**, 849.
Dochez, A. R., and Avery, O. T. (1917) *J. exp. Med.* **26**, 477.
Krumwiede, C., and Noble, W. C. (1918) *J. Immunol.* **3**, 1.
Logan, W. R., and Smeall, J. T. (1932) *Brit. med. J.* **1**, 188.
Neufeld, F. (1902) *Z. Hyg. InfektKr.* **40**, 54.
— and Etinger-Tulczynska (1931) *Ibid*, **112**, 492.
Park, W. H. (1935) *J. Amer. med. Ass.* **105**, 1514.
Ryle, J. A., and Waterfield, R. L. (1933) *Guy's Hosp. Rep.* **83** (**13** fourth series), 389.
Sabin, A. B. (1929) *Proc. Soc. exp. Biol., N.Y.* **26**, 492.
— (1933) *J. Amer. med. Ass.* **100**, 1584.
Valentine, F. C. O. (1933) *Lancet*, **1**, 22.
Vinograd, J., Nemir, R. L., and Park, W. H. (1936) *Amer. J. Dis. Child.* **51**, 792.
Whitby, L. E. H. (1937) Personal communication.

will be available for those specially interested, on application to the secretary of the Cardiac Society.

2. In using either of the two standard precordial leads (e.g., lead IV R or lead IV F) the correct polarity (paragraph 3) is obtained as follows.

The lead switch is turned to lead I. The L.A. terminal is connected to the precordial electrode. The R.A. terminal is connected to the distant electrode—e.g., to the right arm for lead IV R, or to the left leg for lead IV F.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

VOLUNTARY HOSPITALS

THE work done by voluntary hospitals in Scotland continues to increase steadily. It has been lately pointed out, for example, that the annual expenditure at the Glasgow Royal Infirmary was £10,000 greater than the previous year. Glasgow Western Infirmary has treated more patients during the year than ever before in its history. It has also installed a radium beam apparatus of the most modern type, the first of its kind in the west of Scotland. The work at the Edinburgh Royal Infirmary is also to extend and the ordinary expenditure during the past year was £177,000. The cost of building the new maternity hospital and nurses' home is still causing the managers anxiety, for £120,000 is still required.

At recent meetings in connexion with voluntary hospitals, reference has repeatedly been made to the high standard of the work done and, while any attempt to compare the municipal hospitals with voluntary hospitals has naturally been discouraged, the fact remains that the voluntary hospitals in Scotland are still the most up to date in the country. The standard of their management is also very high, from the point of view both of the patient and of the medical staff.

PAYMENT OF MEDICAL STAFF

With the increase in the amount of work done by the voluntary hospital it is natural that the question of remunerating the medical staff should be considered to an increasing extent. The amount of time they give to the hospital work is steadily growing, and there is a general feeling that payment should be made for these services. A definite step in this direction has been made by the Royal Hospital for Sick Children in Glasgow, for it was announced recently that "the directors of the hospital are satisfied that the time has come when they must ask the public to support them in recognising financially in a reasonable manner the great services rendered to them by the members of the medical profession on the staff." It was pointed out that the rate-aided hospitals paid their medical and surgical staffs, and that the time had now come for the voluntary hospitals to follow suit.

Glasgow hospitals are also playing a leading part in Scotland in providing beds for paying patients. A new auxiliary hospital of the Royal Infirmary has just been opened and contains 66 beds for paying patients. It has been built on the outskirts of the city, and the treatment of the patients will be in the hands of the staff of the nearest hospital. The fees payable to those in charge of the case, which will be on the modified scale, are to be a matter of personal arrangement between the patient and the physician or surgeon concerned. The charges for maintenance and nursing will be 3 guineas a week for accommodation in a four-bed ward; 4 guineas for one with two beds; and 5 guineas for a single room.

The Royal Infirmary has also opened a new convalescent home which will provide accommodation for 80 patients.

VIENNA

(FROM OUR OWN CORRESPONDENT)

DIABETICS WITH CORONARY THROMBOSIS

A VERY interesting debate on the problems connected with the insulin treatment of diabetics suffering from coronary disease was introduced at a recent meeting of the Vienna Gesellschaft der Aerzte by Dr. E. Hammerschlag, who demonstrated charts and electrocardiograms of several patients suffering from these two conditions. As he pointed out there is a great diversity of opinion among the leading specialists on the best course in this combination of diseases. While some eminent men believe that to combat the diabetes by giving insulin and the proper amount of carbohydrates comes first, others dread the larger doses of insulin and believe that it is just this prolonged treatment with insulin that precipitates or predisposes them to attacks of coronary disease. Prof. Singer, supporting this view, remarked on the serious increase of stenocardial attacks and lesions of the myocardium lately observed in diabetics treated with insulin, which is supported by evidence from post-mortems. While Dr. Hammerschlag advises the use of slow-acting protamine-zinc-insulin, others prefer to continue the dietetic treatment as long as possible. Nearly all leading specialists of the Vienna school took part in the discussion that followed. Thus Prof. Falta, on his experience of over 2000 cases since 1924, of which over 75 per cent. had received more or less prolonged insulin treatment, is not convinced that this precipitates attacks of angina pectoris. Even in cases with grave coma, requiring massive doses of insulin on the first day, he has never observed important changes in the electrocardiogram. Others quoted the work of Max Rosenberg of Berlin, on 2500 diabetics treated with insulin, who also did not see a fatal attack of stenocardia traceable to this therapy—American physicians go so far as to believe that insulin favourably affects cardiac disease in diabetics, provided that hypoglycæmic shock is carefully avoided. Other observers lay stress on cautious dosage, and it is also important to be very careful in the prescribing of a strict diet in diabetics even without insulin, for this itself may precipitate an attack of cardiac pain. Schur believes that the rapid lowering of the blood-sugar is responsible. He laid stress on the need for abstaining from large doses of insulin, especially in the evening. Prof. Scherf believes that insulin is advisable in diabetics with coronary disease either if there is coma, actual or threatening, or if a change in the diet is necessary. It is not the quantity that matters, but the tolerance of the individual. In some cases he observed even small doses to be harmful.

THE NEW LAW ON NOTIFICATION

A new regulation, valid from the end of 1937, has been published by the Ministry of Health regulating the notification of certain easily transmissible diseases. The conditions are divided into two groups—absolutely notifiable and relatively notifiable. The first group makes a list very similar to that in England. Anyone having or suspected of having one of these diseases, as well as every death that might be due to

them, must be notified at once by the medical attendant to the local medical officer of health. The second group need be notified only when occurring in such places as schools, spas, prisons, and health resorts, or in epidemics or when a community is threatened, as in open tuberculosis. Though the medical attendant is bound, by law, to send in his notifications he cannot expect any remuneration. The local medical organisation, however, may obtain a grant from the local authorities in recognition of the work done for public health by its members.

DEATH OF PROF. KREN

Prof. Otto Kren, chief of the dermatological department of the Municipal General Hospital, has just died at the age of 61 after a short illness. Dr. Kren was a native of Vienna, and obtained his degree at the university. He first studied pathological anatomy under Weichselbaum, and surgery under Eiselsberg, but soon turned to dermatology. He was appointed first assistant to Prof. Riehl, remaining with him for many years. Here he worked chiefly on the dermatoses of the oral mucosa, and on the tuberculous lesions of the skin. In 1912 he accepted an invitation to the dermatological department of the municipal hospital, which became well known under him for its treatment of eczema. He was a splendid diagnostician and therapeutist. He was also very active in the organisation of the Vienna specialists, leading them just when they had to wage a very strenuous fight against elements striving to make civil servants of medical men. He was successful in obtaining for them a "higher standard of fees and protection of their status."

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENTS)

COMPULSORY BLOOD TEST IN PREGNANCY

LAST night the *New York Post* published a front-page editorial entitled 13,000 Babies. This estimate comprises 4000 babies born annually with congenital syphilis and 9000 stillbirths attributable to the same disease. It is the optimistic sense of this editorial that congenital syphilis can be wiped out by requiring a serological test of every pregnant woman. The *Post* has found by a questionnaire that half the obstetricians consulted "will not suggest such a test for fear that their patients will become annoyed and snippy at the very idea." If the test were made compulsory the doctor would be protected from the displeasure of his patients!

As a matter of fact a Bill has already been drawn and will undoubtedly have been introduced into the New York legislature by the time this letter reaches England. It has already been promised support of so influential a character that it is quite likely to be enacted. The Bill requires that a test be made either during pregnancy or at the time of delivery. In case no test is made the doctor must file a statement in the birth certificate explaining his reasons for the omission. Serious students do not anticipate that this legislation will cause any startling decrease in the incidence of congenital syphilis, but they do believe that serological tests in pregnancy will become more numerous and that important information will be collected.

Another Bill which will be introduced very shortly requires a medical statement before the issue of each marriage licence to the effect that the applicants are free from syphilis or that it is not in a communicable stage. A serological test is obligatory and the report on its result will be filed with the department of health. This legislation follows closely the law of Connecticut which has operated successfully for the last two years. Some discussion has taken place as to the type of medical examination that shall be demanded and the Bill will probably be found to require an examination adequate to disclose any of the protean manifestations of syphilis but not disguised to uncover every communicable disease.

OUTBREAK OF BOTULISM

An unusually severe outbreak of botulism is reported from Tucumcari, N.M., by Dr. C. H. Douthirt of the State health department. Twenty-four persons ate lunch together in the home of the late J. Gallegos, whose funeral they had come to attend. All but 4 of these partook of a salad containing home-canned chili. Of the remainder 9 died and 3 were seriously ill at the time the report was made. The 8 others were given prophylactic doses of antitoxin and either because of this or because they were mistaken about eating the chili 6 had no symptoms of botulism, while the 2 who showed symptoms quickly recovered on receiving further doses of antitoxin. *Bacillus botulinus* type A was found by two different laboratories in samples of the suspected chili.

"Almost invariably," writes Dr. Douthirt, "the very first symptoms were inability to see objects more than three or four feet away, dizziness, and double vision. One or two complained of having pain in the abdomen and probably two of the entire series vomited . . . the next complaint was a feeling of heaviness of the tongue, which was usually heavily coated and seemed to be thickened, causing difficulty in enunciation. The next symptom in order was a tightness in the throat. This was followed by difficulty in swallowing and inability to swallow." Symptoms began in almost exactly eighteen hours in cases where a normal amount of salad had been consumed. In addition to those already mentioned a characteristic symptom was general restlessness increasing during the illness. The mentality remained unclouded and hearing acute. One patient answered questions by writing the answers until just before she died; others by nodding their heads or making movements after they had lost the power of speech. Physicians observed ptosis. Pupils were dilated but reacted to light until near the end. Temperature was subnormal; the pulse was at first slow and regular, later becoming irregular and faster. A peculiar pallor was observed. Death in every case resulted from respiratory paralysis.

Dr. Douthirt notes that one mother fatally stricken was allowed to nurse her baby without any apparent ill effect upon the child.

A PSYCHIATRIC RESEARCH BUREAU

THANKS to the generous coöperation of the Rockefeller Foundation a bureau for the assistance of research workers in psychiatry has been established under the auspices of the Royal Medico-Psychological Association. The objects of the bureau are as follows:—

1. Any psychiatrist who wishes for special information as to what is at present known on any subject

of interest to himself is invited to notify the secretary of the bureau. A bibliography of all recent papers relating to the subject will be sent to him together with abstracts of such communications as may seem of great importance, and should he then desire abstracts of any particular papers, especially those published in foreign languages, they will be made for him on demand.

2. Any worker who wishes to start some particular research may on application obtain information as to what has already been done on the subject, and what methods of procedure are advised for further work.

3. Any worker who desires further elucidation on points of technique will be either advised directly from the bureau or put into direct communication with the appropriate members of a panel of experts who have kindly consented to advise on technical questions.

4. Workers desiring the loan of technical manuals for purposes of their work may obtain them on application.

5. Workers desiring to see personally the application of methods of research or treatment, or to confer personally with expert advisers, will be eligible to receive small grants to enable them to do so. These grants, which will be made by the committee, are intended to cover the expense of visits of a few days to laboratories at home or abroad, and are primarily for the use of medical officers who might be unable to make such visits at their own expense.

6. A short account of recent advances in subjects of particular interest, together with a fairly complete bibliography, will be issued at intervals and sent to any psychiatrist who may signify a desire to receive it.

7. Psychiatrists who would like to be put into communication with other workers abroad can receive help from the bureau.

Although it is hoped that all British psychiatrists will be members of the association, the services of the bureau and the grants will be available to any psychiatrist working in the British Empire. The members of the committee are Sir Hubert Bond, Dr. John Brander, Dr. W. T. Fleming, Prof. F. L. Golla, Dr. P. K. McCowan, Dr. W. D. Nicol, Dr. G. W. Smith, and Dr. R. M. Stewart, and communications should be addressed to the Research Bureau, Royal Medico-Psychological Association, 11, Chandos-street, London, W.1.

MEDICINE AND THE LAW

Private Car Used as Ambulance

SPEED limits do not apply to a private car when used as an ambulance. A decision to this effect was made by the Wells city magistrates last week, and, though lay magistrates are not always divinely inspired in their interpretation of the law, there seems no doubt that on this occasion they were right. Section 3 of the Road Traffic Act, 1934, enacts that provisions imposing speed limits "shall not apply to any vehicle on an occasion when it is being used for fire brigade, ambulance or police purposes, if the observance of those provisions would be likely to hinder the use of the vehicle for the purpose for which it is being used on that occasion."

In the Wells case a Glastonbury merchant was performing an errand of mercy by taking a man with a fractured ankle from Glastonbury to Wells. While he was travelling rather fast through a restricted area, he was ordered by a police car to stop. He shouted "I can't stop now; I have an injured man in the car." The decision does not mean that a vehicle conveying a sick or injured patient can ignore traffic directions. It is merely exempt from the speed-limit restrictions. The question is not whether the car is an ambulance but whether it is being used for ambulance purposes.

A Dispensary an Offensive Business

Mr. Justice Johnston of the Irish Free State decided in Dublin recently that a poor-law dispensary was an offensive business in the legal meaning of that phrase and therefore could not be carried on in premises the lease of which contained the covenant "not to carry on any noisome or offensive trade or business on the premises." This decision could not be used as a precedent in England and may yet be upset on appeal; but, even so, it is both interesting and disturbing. For the reasons given by the judge for his ruling apply to every medical institution and the consulting-room of every doctor.

These reasons were two: (1) where persons are collected for medical treatment there is risk of infection; and (2) the storage of drugs, including vaccine, is offensive. It is to be noted he used the words "thousands of people" and "considerable quantities," which suggest that the decision rested upon quantity and that had the premises been used as a surgery in a small way of business with but one or two tubes of vaccine stored there, a different decision might have been given; but the reasons remain the same.

In 1896 it was held that the use of a house in Fitzwilliam-square in Dublin as a private hospital for medical and surgical (but not infectious) cases was a breach of a covenant not to use the house for certain specified businesses or any other offensive or noisy trade, business, or profession (Pembroke *v.* Warren), and there is some English authority to the like effect. A different standard seems to be visible where it is a question of a statutory nuisance under the Public Health Acts (1875 and 1936). In this connexion in the case of Withington *v.* Manchester Corporation (1893) it was decided that a small-pox hospital was not an offensive business. The recent Dublin decision appears to depend upon the meaning of the words "noisome or offensive" in the covenant of a lease, which probably has a much wider significance than the restricted sense in which these words are used in the Public Health Acts. In his decision, as reported in the *Journal of the Irish Free State Medical Union* for January, Mr. Justice Johnston said nothing about any offence which might be caused by a crowd of dirty people awaiting treatment, but specified the risk of infection. That such a risk may occur cannot be denied, though we have more evidence of spread of infection in social gatherings of "healthy" people than in out-patient departments; but we do not know upon what grounds he decided this to be "offensive." Similarly, though the storage of drugs may be a potential danger, we are unable to see how it can be offensive. If it were, every chemist's shop and most bathrooms would be premises carrying on an offensive business. Since a small-pox hospital is not an offensive business, though it contains in maximum concentration the two objectionable features to which Mr. Justice Johnston referred—risk of infection and storage of vaccine—it should follow that no medical establishment can be an offensive business per se, though of course it may be carried on in such a way as to be a nuisance.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM A BACTERIOLOGICAL BACK-NUMBER

IV

A DAY or two ago there appeared in the personal column of a famous London daily the following item:—

S O S—Is there an AMERICAN SPECIALIST on BLOOD DISEASES in London? Pray answer this.

One forbears to smile as one never knows what anguish and misfortune may lie behind such an appeal; but one cannot help being curious as to the circumstances under which it was made. One could understand an application for a French chef or an Italian marble mason, but a skilled doctor it might be thought would have exercised the same skill the whole world over. There seems no way of getting any nearer the matter unless one were oneself an American specialist of the type required, and for lack of a better explanation we can only think that this entry in the agony column is one more illustration of the curious, complex, and largely irrational grounds upon which the average patient chooses his doctor. The patient certainly chooses his doctor on different principles from those which make him decide on his garage mechanic or a gardener. It is not a matter merely of choosing a knowledgeable and impartial expert and telling him to get on with it. No doctor is allowed to be merely ordinary. Patients delight in forming their own opinion of their doctors, though they might know that their judgment in the matter must be almost worthless. If they like their doctor he is everything that is perfect: if they don't, then "the reason why I cannot tell, I do not love thee Dr. Fell," and there's the end to it. The patient likes to talk of his doctor as a "clever" doctor though it is hard to see how the estimate of cleverness is arrived at. The patient will sometimes refer proudly to the "high qualifications" of his doctor, but he rarely seems to lay much stress on a mere string of degrees and diplomas. I have a good string myself—to be precise £156 worth—but I have never found myself accepted as a "clever" doctor; in fact I usually find it difficult to get anyone to believe that I am qualified at all. Appearances go for much and it is certainly important that a doctor should *look* like a doctor; but if we ask again what a doctor should look like it is not easy to reply. Perhaps the important thing is that he should not look quite like other people; there should be something mysterious about him—some slight reminder of the primitive and the occult, something to link him with the ancient medicine man whose memory still lies only superficially buried in the subconscious folk mind. That knowing young practitioner Mr. Bob Sawyer had got the idea when as he said "I put on a black suit of clothes and a pair of spectacles, and came here to look as solemn as I could." Even to this day the doctor must adopt a priestly conservatism in his dress and we find him wearing a stiff collar when everybody else around is wearing a soft one, and after all it is not so long ago when even in remote country districts the top-hat and frock-coat was still his daily garb.

* * *

When one considers the enormous temptations the ordinary practitioner has to adopt the methods of the quack it is a remarkable evidence of the morale and integrity of the profession that they resist the temptation. Ordinary patients certainly like a touch of quackery about their doctor and if the doctor has not got it naturally—and he usually has not—they insist upon investing him with it. We have all heard from patients the astonishing and mysterious statements alleged to have been made by brother practitioners. We have heard how the doctor has solemnly diagnosed a "chill on the liver" though we know perfectly well that our colleague has no such a diagnostic term in his vocabulary. We have a good idea of how these statements come about: a patient is very partial to his own diagnosis and as a wise doctor is chary and wary about it the patient takes the matter in hand and puts the necessary words into his mouth. The key is given in the old *Punch* joke—"I say it's measles, doctor, what's your humble, opinion?"

And patients seem sometimes to derive considerable satisfaction from running down their doctors. That is the natural reaction against the high and almost heroic legend which normally surrounds the doctor's craft. Human beings when they tire of their mumbo-jumbo are given to knocking him off his pedestal. In the old Greek plays the Gods were made to look foolish at times and King Arthur, so glorious in the romances, cuts some sorry capers in the fabliaux.

Patients will sometimes exult over their doctor's mistakes even when they are themselves the victims. A circular was recently left at the houses in the St. John's Wood neighbourhood. It was headed "Have You a Story" and it announced that a "Mr. H. V. Langley is completing a book on manipulative surgery, and would be pleased to receive personal experiences for publication relating to injuries or conditions treated by doctors prior to consulting Mr. Langley." We feel that if Mr. Langley is not going the right way to investigate the claims of manipulative surgery he certainly ought to be able to present some interesting data on the psychology of patients, and if as is stated the price of the promised book "will not exceed 6*s*." a copy I am not sure that I shan't have six shillings' worth.

* * *

It is curious that laymen so readily charge medical men with avarice. Probably no other profession ever does so many services for which it should be paid and yet is not paid and certainly no other profession has to work so intensely and with so little off time. True, a doctor has a certain standard of living and is, speaking generally, fairly well off; but his training is long and difficult and his standard of life is to some extent dictated by the patient rather than by himself. He has to have a car wherein to visit his patients and maids to open his door to them by day and night. A patient quite ready to complain of a very ordinary doctor's bill would snort if the doctor did his rounds on a push bike or a motor-cycle combination. I know an old doctor who dislikes cars and always goes his round on his feet and he tells me he only keeps the big American car which lies unused in his garage because "patients expect a doctor to keep a car even if he doesn't

use it." Chaucer's doctor was allowed to be "a verrey parfit practisour" and the profession may well be proud of the character Chaucer gives to it; but even he finishes up with the remark:—

> "For gold in phisik is a cordial
> Therefore he lovede gold in special."

The older satirists, who were certainly out to find out the weaknesses of all professions, are generally hard on doctors and rarely fail to charge them with incompetence and greed. According to old John Earle the best cure his "Mere Dull Physician" has done "is done upon his own purse, which from a lean sickness he has made lusty" and lest surgeons should smile at the discomfiture of the mere dull physician let us add this item from his character of a surgeon: "The rareness of his custom makes him pitiless when it comes." Nicholas Breton gives us characters of both a worthy and an unworthy physician. "An unlearned and so unworthy physician is a kind of horse-leech, whose cure is most in drawing blood, and a desperate purge, either to cure or kill, as it hits"; but there is surely also a slight sting even in his remark on his worthy physician that "by the secret of his skill out of others' weakness he gathers his own strength."

Plato was more understanding and generous. "Then is it not true," he asks, "that no physician, in so far as he is a physician, considers or enjoins his own interest, but that all seek the good of their patients?" Elsewhere he tells us that "the science of medicine, in a word, is a knowledge of the love affairs of the body—and he is the most skilful physician who can trace those operations of the good and evil love, can make the one change places with the other, and attract love into those parts from which it is absent." By love in this sense Plato no doubt meant the harmony and health of body and mind, and if we demand a short answer we can hardly get a more satisfactory one to the question "what is the skilful doctor?"

PANEL AND CONTRACT PRACTICE

Messages

AN insured woman was taken ill late one evening and next morning her mother attended at the practitioner's surgery and obtained a prescription for medicine for the acute diarrhœa from which the daughter was suffering. The daughter took the medicine as directed but as her condition became worse during the day a message was sent to the doctor on the following morning asking him to visit her immediately and also her mother (a private patient) who had meanwhile had a seizure. The messenger called at the surgery before 9 A.M., and was assured that the practitioner would be informed as soon as he arrived at the surgery. At about 2 P.M., as the doctor had not then called, his surgery was rung up and the assurance given that the doctor had been told and might be calling any minute. An hour later the patient's condition having become worse another doctor was summoned, who gave an injection to ease the pain, and the insurance practitioner was notified that he need not now call. The second doctor remained in attendance for several days.

When the medical service subcommittee inquired into the circumstances the practitioner agreed he had received the first request for a visit but no indication of any degree of urgency. He finished his surgery work at about 12.30 P.M. and made seven visits before lunch at about 2.20 P.M. He did not receive the two o'clock message; this message reached his assistant who lived at the surgery, and as he and the assistant had prepared the visiting list together and marked urgent cases the assistant assumed the principal would be visiting this patient. The three o'clock message taken by his housekeeper and cancelling the request for a visit came just before he went out again, and he interpreted it as meaning that the insured person's condition had improved.

The committee was satisfied that the practitioner received the first message but did not realise that his services were urgently required; that the second message was received at his surgery but was not transmitted to him, and that he was negligent in not making proper arrangements for the transmission to him of messages received during his absence from the surgery; and that he failed to visit and treat the patient whose condition so required. They decided to recover from the doctor the expense incurred in calling in the services of the second doctor and to repay the amount to the person by whom the expense was incurred; and while in this instance they did not propose to ask the Minister to withhold money they would be compelled to take a more serious view another time. The doctor is to be asked to make more satisfactory arrangements for the receipt and transmission of messages.

In a case such as this it is often difficult to distinguish between the occasional miscarriage of the best-laid plans and the failure to make reasonable provision. No doubt the original messenger intended to convey that a visit was urgently necessary, and clearly the doctor did not get the impression that this was so—in fact, he said he was told he was wanted for the patient's mother "and while there to see the insured person." Short of a machine of the dictaphone type to record the actual words of the messengers practitioners can hardly avoid the risk of failing some time or other to appreciate the urgency of a call which is really urgent. And even then the inflection of the voice may make all the difference in the meaning of "Will doctor please come as soon as he can."

The Drug Tariff

At present insurance practitioners are supplied with a copy of the drug tariff once a year. Representations have been made to the Minister by the Insurance Acts Committee that practitioners ought to have a copy of each (quarterly) issue. The Minister has agreed to do this but has suggested that the most suitable course to pursue is to supply a copy of the tariff once a quarter to those practitioners who wish to have it so often. The London panel committee has circularised all its constituents asking how they feel about it.

Road Traffic Act

The London panel committee has been informed that an insurance company refused to pay a fee to a doctor for emergency treatment under the Road Traffic Act on the ground that the written application had not been sent by registered post. The Act provides that written applications for fees are to be delivered to the person who was using the vehicle or sent by registered post. This should be borne in mind.

CORRESPONDENCE

TRANSFUSION OF FLUIDS IN INFANCY

To the Editor of THE LANCET

SIR,—Dr. Ormiston, in his article in THE LANCET of Jan. 8th, is obviously only concerned with the infant when in hospital. By the time a child comes to hospital he is very ill and the various routes which Dr. Ormiston suggests are the only obvious ones. I should like to point out that the moment when the giving of fluids is most efficacious is in the home when the acute vomiting has subsided. The child should be given bottles full of half-normal saline by the mouth, and he should be allowed to drink as much as he wants for the first twenty-four hours, no food being given during this period. I have often been impressed at the amount of saline a child will consume; for instance an infant of three months' old will take as much as a pint of fluid in this way in twenty-four hours. The practical point is to get as much fluid into the body as possible while the child can suck vigorously. The good results of this treatment can be seen next day. The sooner the acid-alkali balance is restored the better the prognosis in all cases of vomiting and diarrhœa.

It is the general practitioner in the home who has the best chance of restoring this balance, long before the case gets to hospital. I have found that if an infant suffers from diarrhœa and vomiting for three days without any attempt being made to restore fluid to the body that child is in great danger, and these are the cases that help to keep up the unnecessarily high infant mortality from diarrhœa and vomiting during the first year of life.

A condition of alkalosis is left after the acute vomiting subsides and the chloride in the half-normal saline helps to counteract this alkalosis. The normal balance between acid and alkali is an extremely delicate mechanism and I cannot do better than quote Dr. H. L. Marriott, who says that "some idea of the delicacy of the adjustments to maintain acid-alkali balance and its maintenance may be obtained by a consideration of the fact, namely, that a reaction of the blood as acid as distilled water or as alkaline as ordinary tap water is incompatible with life."

The good results which I have obtained during the last thirteen years, in 1419 cases of diarrhœa and vomiting with only 47 deaths, making 3·8 per cent., are largely due I think to the early treatment in the home that I have described.

I am, Sir, yours faithfully,

Kensington, Jan. 15th. RONALD CARTER.

PHARYNGEAL AND LARYNGEAL NYSTAGMUS

To the Editor of THE LANCET

SIR,—More than fifty-one years ago I published in your columns,[1] under the above title, a clinical observation of continuous rhythmic movements of the pharynx and larynx, in a girl aged 16, who suffered from a cerebellar tumour: ocular nystagmus was also present and was synchronous with the movement in the pharynx and larynx. In calling this latter movement "nystagmus" I pointed out that the term was not strictly accurate etymologically, and in my second communication correcting a verbal error (cerebellar for cerebral) I used the word "clonus."

Since that date a small number of similar cases have been published—according to N. Leshin and T. T. Stone,[2] 26 up to the year 1931—the authors variously using the terms nystagmus, nystagmoid, or rhythmic continuous movements, myoclonus, rhythmic myoclonus, &c. The most recent authors, G. de Morsier and R. Junet,[3] entitle their paper "les myoclonies velo-pharyngo-laryngées," kindly speak of the "syndrome de Spencer," and quote my original communication. I think it would be preferable if these cases were published under the heading "nystagmus." It is true that that word, which etymologically means "nodding, drowsiness," is a very inaccurate term for the movement, either of the eyes or throat; but it is of respectable antiquity as a label for the continuous rhythmic movement of the eyes, and may be applied to the similar movement of the pharynx and larynx. The word "clonus" is even less suitable etymologically and is in practice usually employed for temporary and violent muscular contractions. The use of the term nystagmus for the throat condition points to its frequent association with the ocular movement, and perhaps may lead to more frequent and careful examination of the throat in cases of ocular nystagmus and cerebral and cerebellar tumours and diseases, and to the further elucidation of the pathology of this syndrome, in which some progress has been made.[3]

Sir, it is a long time since the appearance of my first medical publication, Pharyngeal and Laryngeal Nystagmus: I have a liking for the title still. Perhaps you will allow me to quote, in relation to this little matter, a great name, William Harvey, who concludes the preface to his "Generation of Living Creatures" (1653) thus: "For as they which finde out new plantations and new shores, call them by names of their own coyning, which posterity afterwards accepts and receives; so those that finde out new secrets have good title to their compellation. And here, methinks, I hear Galen advising; *If we consent in the things, contend not about the words.*"

I am, Sir, yours faithfully,

HERBERT R. SPENCER.

Bickenhall Mansions, W., Jan. 14th.

THE LONDON M.B. FINAL

To the Editor of THE LANCET

SIR,—I am amazed at the warmth of feeling manifested in Sir E. Graham-Little's recent contributions to your correspondence columns when he speaks of the Conjoint Board and its students. He would do well to remember that a large proportion—perhaps even a majority—of the medical practitioners in this country owe their status entirely to their L.R.C.P. and M.R.C.S., and there must be many who, like myself, are grieved by the imputation that we are not worthy of our London medical schools. Whatever the University Grants Committee may have to say where finance is concerned, or the court of the University where its undergraduates are concerned, it would be an evil day for the people of this country if all who were unable to obtain a degree in medicine were excluded from the Register. So would London University have lost two recent deans of the Faculty of Medicine, several professors, and many members—largely surgeons—from the staffs of its teaching hospitals.

[1] *Lancet*, 1886, **2**, 702, 758.

[2] *Arch. Neurol. Psychiat., Chicago*, 1931, **26**, 1236.
[3] *Schweiz. med. Wschr.* 1937, **67**, 996.

A man who is excluded by his inability in some preliminary science or by financial pressure from registering any but the Conjoint diplomas is not necessarily an incompetent practitioner; far from it, many of the best and wisest among us are proud to write only L.R.C.P., M.R.C.S. after our names. And if Sir Ernest must see that some of us have examination as well as professional ability, let him look down the lists of M.R.C.P. and F.R.C.S. diplomates and note that some at least of those without an M.B. could have made short work of the London final.

Let London University decide how best to manage its examinations, but leave out disparaging references to the Colleges and those who hold—or hope to hold—their diplomas. Many of us are disinterested in the subject recently under discussion, but we are proud of our L.R.C.P., M.R.C.S., and our medical schools. I am, Sir, yours faithfully,

Jan. 17th. ONLY CONJOINT.

To the Editor of THE LANCET

SIR,—Certain figures for 1936–37 which were presented to the court at its meeting on Jan. 12th, and which therefore came under my notice, oblige me to correct the description derived from earlier and somewhat misleading statistics which I gave, in my letter to you of Jan. 8th, of the composition of the student-body in London medical schools. A more accurate statement of the present position would be that rather more than half of the students in those schools are reading for the London University degree; rather less than one-sixth for other university degrees, chiefly Oxford and Cambridge; approximately one-third for non-university qualifications, chiefly Conjoint Board.

I am, Sir, yours faithfully,

E. GRAHAM-LITTLE.

Wimpole-street, W., Jan. 15th.

THE DANGERS OF THOROTRAST

To the Editor of THE LANCET

SIR,—I was glad to note the warning sounded in your annotation of Jan. 1st on the use of Thorotrast. It is surprising to hear that this drug is still being used in man. In the application of a new *therapeutic* method one must be prepared for occasional untoward incidents, even though extended experiments on animals may have indicated that the preparation is harmless. But with a preparation which serves only *diagnostic* purposes one ought to demand absolute harmlessness. As recent publications appear to give the impression that thorotrast was not thoroughly investigated before it was marketed, may I refer to investigations that I carried out with the preparation 1073a (later given the trade name thorotrast) in 1930–32.[1-3]

Experiments were carried out on 40 rabbits and about 100 rats. The results with the rabbits were published after 18 months' observation. All the animals tolerated even ten times the dose that is usually applied in man, without the slightest disturbance during the whole period of observation, provided the injection was made slowly, diluted with glucose, and given at intervals of 24 hours. The blood count did not show any noticeable change in spite of the fact that from the third to the fifth month (according to the quantity of thorotrast given) a great deal of thorium was found in the bone-marrow. But injected animals were found to die after the slightest interference such as the giving of an anæsthetic or the withdrawal of a small quantity of blood.

My investigations yielded the further following results:

1. Phagocytosis decreased from the normal 38 per cent. to 4·2 per cent. six to twelve months after giving thorotrast. (The leucocytes were taken from artificially produced ascites.) The decrease in phagocytosis was not significant immediately after the application of thorotrast, but increased gradually.

2. Thorotrast was found to be stored in the reticulo-endothelial cells. These were soon destroyed and the thorotrast particles were taken up by freshly regenerated reticulo-endothelial cells.

3. Liver and spleen showed degenerative processes like an atrophic cirrhosis.

4. Capillaries and small vessels were filled up by thorotrast, possibly being stored within the endothelial cells, and thrombosis frequently followed.

Accordingly a warning was sounded against the use of thorotrast in man.

Selbie [4] in 1936 showed that small subcutaneous doses of thorotrast may produce sarcoma in rats, and last year Northfield and Russell [5] published 5 cases in which cerebral thrombosis followed arteriography. If Freeman after ventriculography (longest evidence after two months) finds only thickening of the meninges at the base of the brain, with a large amount of thorotrast still lying free in the spaces, it is probable that the thorotrast particles wander later into different organs and lead to thrombosis, as I was able to demonstrate. In any event ventriculography can be done without this danger—e.g., by injection of air. It is difficult to imagine that further workers will follow out the suggestion that thorotrast should be used for ventriculography when regard is had to the danger of the method and also to the satisfactory results obtained by simple injection of air.

I am, Sir, yours faithfully,

Welbeck-street, W., Jan. 14th. Z. LEITNER.

GASTRO-INTESTINAL SIGNS OF NUTRITIONAL DEFICIENCIES IN CHILDREN OF SCHOOL AGE

To the Editor of THE LANCET

SIR,—As long ago as 1926, when exploring the effects of ultra-violet radiation on the common ailments of school-children, I found that the frequent vomiting attacks from which so many children suffer were strikingly benefited by this treatment—so much so that it became my custom almost to guarantee cure of such cases by radiation. A type of ailment which seemed to me somewhat akin to cyclical vomiting consisted in frequently recurrent abdominal pains, apparently colicky and often aggravated by taking food. This also I found to be greatly improved in many cases, and in some completely relieved, by radiation. The radiation was from a mercury-vapour lamp, and was given twice weekly. In subsequent years once-weekly radiation was found to give the same results. So far as I know, the benefit of ultra-violet radiation in this type of case has not been noted by anyone else.

Speculating as to the rationale of this treatment, I tried the effect of calcium and vitamin D in the form of Ostocalcium tablets (Glaxo), 1 tablet three

[1] Anders, H. E., and Leitner, Z., *Klin. Wschr.* 1932, **11**, 1097.
[2] Bucky, G., and Leitner, *Fortschr. Röntgenstrahlen*, 1932, **45**, 561.
[3] Leitner, *Ibid*, 1932, **46**, 47.
[4] Selbie, F. R., *Lancet*, 1936, **2**, 847.
[5] Northfield, D. W. C., and Russell, D., *Ibid*, 1937, **1**, 377.

times a day, each containing calciferol 500 international units of D. Both the vomiting and the recurrent colic cases showed improvement, but the effect was not so striking or consistent as with radiation. I concluded, therefore, that radiation does something more than mobilise vitamin D in the body. A recent observation of Yoder[1] indicates that vitamin D is necessary to normal gastro-intestinal functioning. Is the benefit of ultra-violet radiation and of vitamin-D administration due to improved calcium metabolism? If so, does the calcium act by lessening the tendency to acidosis, or by its effect on the tonicity of the involuntary muscle of the alimentary tract, or both? Or are these two effects one and the same thing?

I had for many years suspected that insufficient vitamin-B intake predisposed to these gastro-intestinal crises. Acting on this idea, I have recently treated a series of several dozen cases with vitamin B_1, given as synthetic aneurin in the form of Benerva (Roche). One benerva tablet a day gives 500 I.U., which is regarded as an optimal dose.[2] In every case in which this treatment was continued for more than a week there was a striking improvement, particularly in the vomiting cases. In the majority the treatment was continued and followed up for at least four weeks. Vomiting, which had been recurring fairly frequently and regularly for long periods—often one, two, or three attacks per week—almost always ceased in the first week and did not recur during the giving of the B_1 tablets. In several cases the parent spontaneously volunteered the additional information that the child was brighter and more lively, probably because this vitamin stimulates oxidation and general nervous well-being.

It is well established that ultra-violet radiation promotes general nervous stability and well-being, being a fairly reliable remedy for nervous fidgetiness, restlessness, fretfulness, poor sleep, poor appetite, and all the other symptoms generally classed under the heading of debility. It is of some interest that ultra-violet radiation and vitamin B_1 should have similar effects both in the remedy of these abdominal crises and in promoting general nervous stability. Ultra-violet light and vitamin D probably act on one metabolic cycle, that of calcium, and vitamin B_1 on another cycle, that relating to neuromuscular tonicity and oxidation. While the improvement of one or other of these processes may be sufficient to bring about a cessation of symptoms, it seems likely that the simultaneous treatment of both nutritional deficiencies would be more effective. In view of the remedy of these abdominal crises by nutritional means, it seems justifiable to regard their occurrence as a sign of nutritional deficiency.

I am, Sir, yours faithfully,

Birmingham, Jan. 12th. E. H. WILKINS.

VITAMIN-C DEFICIENCY

To the Editor of THE LANCET

SIR,—Prof. Leonard Parsons is under a misapprehension in his Withering lecture, published in your last issue, when he assumes that I dismiss the existence of latent scurvy as characterised by vague symptoms of ill health and by a response to specific treatment. I fully accept the term when used in this sense. My criticism is levelled against the reckless application of this and the whole gamut of similar terms to a condition of "unsaturation" in which the individual is in apparently perfect health and is often even near the "saturation" point.

I am, Sir, yours faithfully,

S. S. ZILVA.

Lister Institute of Preventive Medicine, Chelsea Bridge-road, S.W., Jan. 15th.

[1] Yoder, L., *Amer. J. Dig. Dis. Nutr.* 1937, **3**, 829.
[2] Baker, A. Z., Wright, M. D., and Drummond, J. C., *J. Soc. chem. Ind.* June, 1937.

"REVOLT OF THE DOCTORS" IN AMERICA

To the Editor of THE LANCET

SIR,—I am grateful to you, as I am sure are all the other members of our committee, for the friendly and serious discussion which you have given in your editorial of Nov. 27th to our Principles and Proposals for the improvement of medical care. I am grateful also for the extended report of the subject by your correspondent in THE LANCET of Dec. 18th (p. 1450). I must, however, draw attention to an inaccuracy in your correspondent's report where he refers to the events that took place at the Atlantic City meeting of the American Medical Association. The resolution introduced for the New York State Medical Society by Dr. Samuel J. Kopetzky was not introduced at the suggestion of our committee and was a modified form of our proposals which our committee has not approved. Your correspondent also states that "The resolution was defeated by a very large majority." He is hardly to be blamed for this misstatement since he has no doubt taken it from an editorial in the *Journal of the American Medical Association* (Oct. 16th, p. 1280), where it is stated that "a resolution from the House of Delegates of the New York State Medical Society, obviously a slightly modified form of the American Foundation proposals, was introduced in the House of Delegates of the American Medical Association at Atlantic City and there rejected with an enthusiastic unanimity which indicated quite clearly the utter dissatisfaction of the medical profession with these proposals."

It is very important to us that the inaccuracy of this statement should be thoroughly understood. The impression in the lay press and elsewhere that there is a "revolt" among American physicians arises entirely from this editorial in the official journal of our Association. What actually happened at Atlantic City was something very different and may be read in the report of the proceedings of the house of delegates (*J. Amer. med. Ass.* 1937, **108**, 2128 and 2208). Dr. Kopetzky's resolution is found on p. 2142. On p. 2217 the first report of the reference committee states that "this subject presented here is too important, too vast and too widespread in its application to be justly and adequately considered in a few hours or even a few days by any reference committee. It recommends that the resolution be referred to the Board of Trustees of the American Medical Association for consideration and action at the earliest possible time." The house of delegates did not accept this recommendation and referred the matter back to the reference committee who were, therefore, obliged to report again and their second report is found on p. 2220. This report is too lengthy to be summarised in this letter, but you will find that it points out in detail that certain of our Principles and Proposals have already been recognised by the American Medical Association, and states that the Association is "genuinely interested in all plans for providing and distributing medical care." It goes on to recommend "that the bureaus, councils and committees of the Association continue their studies of the need for and the methods of distributing medical care, to the end that the

American Medical Association shall continue to do everything possible to promote and protect the health of the American people." On motions duly seconded and carried, the report of the reference committee was adopted.

After the passage of this resolution by the house of delegates, our committee submitted for the first time its Proposals to the various medical organisations of the country in order that they might receive that discussion and consideration which the house of delegates of the American Medical Association had promised to them. If this matter had been put before the newspapers in its true light, it could not have been interpreted as "revolt." Our committee hopes that in spite of the unfortunate editorial in the official journal of our Association, our colleagues may still be prepared to give their dispassionate consideration to our Proposals. We do not ask for more, and the growing number of adherents to the Proposals does suggest to us that discussion and consideration are taking place.

I am, Sir, yours faithfully,

J. ROSSLYN EARP.

Department of Health, Albany, N.Y., Dec. 29th, 1937.

*** A more detailed account of what happened at Atlantic City on June 7th, 1937, was given in an earlier letter from one of our correspondents (*Lancet*, 1937, **1**, 36).—ED. L.

FOMENTATIONS OR LYMPHATIC CONTROL?

To the Editor of THE LANCET

SIR,—Old traditions and customs die hard, and I fear it may be long before foment, stupe, and poultice pass away. Yet it is high time that the use of these moist hot applications was abandoned, at any rate in cases of septic infection.

The first objection to the foment—that it tends to spread infection under its shelter—is increasingly recognised. My object in writing this letter is to draw attention to another and perhaps more serious danger, and to an alternative form of treatment that I have found most valuable. The danger I have in mind is that any form of foment or poultice dilates the lymphatic channels around the septic lesion and thus promotes the central flow of infected lymph. The method of treatment I call "lymphatic control."

We are all familiar with the red streak running up the arm in a case of acute infection of the hand, and following the anatomical text-books we are apt to think of the infective process spreading upwards through a single channel. This is incorrect; there is not a single channel but a group of small ones, and investigation shows that they have very thin walls, compared with veins, and are therefore *independently compressible*. The practical bearing of these facts is that it is possible by applying *light* compression (lymphatic control) to stop the passage of infection centrally through the lymphatic vessels—a method of treatment infinitely preferable, I need hardly say, to the opening-up of these channels around the lesion by a fomentation.

When I have recommended this method people have said to me: "But surely this is only Bier's treatment by hyperæmia?" Actually it is nothing of the kind. Bier's method is to prevent the flow of blood through the vein—a process requiring considerable pressure which can only be borne for a limited period. Bier's object was to add congestion to congestion. In practice, however, his technique is by no means always carried out effectively; indeed the application of the bandage lightly (light Bier's congestion) has sometimes been recommended, and has many successes to its credit. In my view this "light Bier's congestion" is a contradiction in terms, and whenever a wide elastic bandage is applied for a sufficient period in the right place the practitioner is really adopting my "lymphatic control."

The purpose of this measure is, as I have said, to prevent the central spread of infection through the lymphatic channels, and this I achieve by binding Elastoplast firmly over the limb on the proximal side of the lesion (but not over it, except perhaps in subacute cases, when an opening should be left for escape of discharge, if any). The controlling bandage must be left on for at least several days after the discharge has ceased. I sincerely hope this method, which I have found so effective, will receive general trial.

I am, Sir, yours faithfully,

London, Jan. 17th. J. L. AYMARD.

WHO PAYS THE DOCTOR CALLED TO AN ACCIDENT?

To the Editor of THE LANCET

SIR,—In reference to Mr. Harcourt Kitchin's letter, I can say from the experience of one hospital that there is really not much difficulty in collecting the 12*s*. 6*d*. for the emergency treatment of road traffic accidents, and I believe that is the general experience where arrangements have been established in accordance with the procedure suggested by the British Hospitals Association. It may be worth while to note, however, that the tariff companies and those in association with them have agreed to an arrangement which will appreciably add to the income of the hospitals from this source. Until the end of last year if a patient was admitted into hospital then the 12*s*. 6*d*. was deducted from the amount received in respect to the in-patient treatment. The companies have now agreed to a more generally accepted interpretation of the law that the hospitals are entitled to this sum in addition, even if the patient becomes an in-patient.

In this connexion there is a point of practice which may be of some general interest. Before the Act of 1934 was passed it was agreed by the hospitals that the cost of the first treatment was 5*s*. It is clear from the provisions of the Act that the bulk of the payment is intended for the personal services of the doctor. Accordingly the committee of King's College Hospital have allocated a sum of 7*s*. 6*d*. out of the emergency fee to a medical staff fund at the disposal of the medical board.

I am, Sir, yours faithfully,

C. E. A. BEDWELL,
House Governor.

King's College Hospital, London, S.E., Jan. 17th.

ROYAL SANITARY INSTITUTE.—Lord Bessborough will preside over the health congress of this institute which is to be held at Portsmouth from July 11th to 16th. There will be sections dealing with preventive medicine; architecture, town-planning and engineering; maternity, child welfare and school hygiene; veterinary hygiene; national health insurance; hygiene of food; and tropical hygiene. Conferences of representatives of local authorities, medical officers of health, engineers and surveyors, sanitary inspectors and health visitors will also take place during the congress. Further information may be had from the secretary of the Institute, 90, Buckingham Palace-road, London, S.W.1.

PUBLIC HEALTH

VITAL STATISTICS FOR 1937

THE Registrar-General has issued a provisional statement of the figures for birth-rate, death-rate, and infant mortality for the year 1937.

—	Birth-rate.	Death-rate.	Infant mortality-rate.
England and Wales ..	14·9	12·4	58
125 county boroughs and great towns, including London	14·9	12·5	62
148 smaller towns ..	15·3	11·9	55
London (administrative county)	13·3	12·3	60

The smaller towns are those with estimated resident populations of 25,000–50,000 at the 1931 census.

Note.—The birth- and death-rates for England and Wales as a whole are calculated on the estimated mid-1937 population, but those for the towns aggregates and for London on the estimated mid-1936 populations. The birth-rate is based on live births and the death-rate on crude deaths.

The birth-rate for 1937 is 0·1 per 1000 above that for 1936, 0·2 above that for 1935, and 0·5 above that for 1933, the lowest recorded. The crude death-rate is the highest on record since 1929, and is 0·3 above that for 1936, an increase that is largely associated with the heavy influenza mortality of the first quarter of the year. The infant mortality is 1 below that of 1936 and only 1 above that of 1935, the lowest record. The rates are provisional and are issued for the information of medical officers of health, but they are not likely to need substantial modification.

CONTROL OF DISEASE SPREAD BY AIRCRAFT

The International Sanitary Convention for Aerial Navigation, signed at The Hague in 1933 and ratified by the British Government in 1934, has now been implemented by the issue of the Public Health (Aircraft) Regulations,[1] which are to come into force on July 1st.

The convention of 1933 aimed at achieving for aircraft, with the necessary modifications, what the International Sanitary Convention of 1926 had done for shipping—on the one hand to prevent the spread of the more serious epidemic diseases from country to country, and on the other hand to provide safeguards against interference, delay, and expense from unwarranted and discrepant sanitary and quarantine measures. The differences between the two conventions are those of emphasis rather than principle. Since the most important vector of disease carried by shipping is the rat, the 1926 convention was mainly concerned with measures against rats and plague: the vector carried by aircraft which is most to be feared, however, is the mosquito; hence the 1933 convention laid greatest stress on measures against insects and yellow fever. The new regulations are based on Section 143 of the Public Health Act, 1936, which gives the Minister of Health power to make regulations for the prevention of infectious disease; but since in this country none of the "Big Five" diseases with which the International Sanitary Convention for Aerial Navigation mainly deals—plague, cholera, yellow fever, typhus, and small-pox—is now endemic or epidemic, the measures envisaged in the regulations will serve to prevent the introduction rather than the export of these diseases.

THE ARRANGEMENTS AT AERODROMES

Broadly speaking, the organisation set up is as follows.

Local authorities may, and if required by the Minister, shall, provide at customs aerodromes for which they are the sanitary authority, medical officers to assist the medical officer of health in carrying out the regulations, premises and waiting-rooms for medical examination and temporary isolation, and means of transport and hospital accommodation. If the Minister is satisfied that a customs aerodrome has an organised medical service with, besides the above facilities, equipment for taking specimens for pathological examination, apparatus for disinfection and for getting rid of insects and rats, and a pure water-supply and adequate system for the disposal of waste water and excreta, and also that the aerodrome is kept as far as possible free from rats, he may recognise it as a "sanitary aerodrome" and it may then be designated as a local area for the purpose of notification of infectious disease. The names of sanitary and authorised (i.e., customs) aerodromes are to be communicated to the International Health Office in Paris, which has already issued the first list of those in the various categories (July 31st, 1937).

It should be noted that the local authority responsible for carrying out the regulations is the local authority maintaining the aerodrome, in the first place, and, secondly, the sanitary authority in whose area the aerodrome is situated. In the case of an aerodrome serving, but not maintained by, a large town, and situated in a rural area outside the town, it is presumably the rural district council that is financially responsible for the provision of its sanitary services.

Aircraft which are infected—i.e., which have or recently have had on board a case of one of the above-named convention diseases—are subject to certain measures, such as disinfection, appropriate to the disease as laid down in the convention and appended as a schedule to the present regulations. Some of these measures must be carried out at a sanitary aerodrome. Others, such as the medical inspection and isolation or surveillance of passengers and crew may be performed by the medical officer at a customs aerodrome. Similarly aircraft coming from an infected locality, as notified in the weekly record of infected areas circulated by the Ministry of Health, are also subject to measures. Just as in port sanitary work, customs officers must be provided with lists of infected areas and have power to detain aircraft for medical inspection up to a maximum of three hours.

As far as aircraft leaving this country are concerned, the medical officer has similar powers of inspection, prohibition of embarkation, and enforcement of other measures only in the unlikely event of aircraft leaving an area which has been declared infected with plague, cholera, yellow fever, or typhus and small-pox in epidemic form. A most interesting clause is 11 (2): "If severe small-pox (variola major) exists in any part of Great Britain, the medical officer may prohibit any person coming from such part, who has been in such contact with any person suffering from the disease as to render him liable to transmit infection, from embarking on any aircraft going beyond Great Britain, Ireland, the Channel Islands, and the Isle of Man. Provided that etc. . . ." This, we think, is the first occasion on which a distinction between severe and mild small-pox (variola major and minor) has been drawn in an official

[1] H.M. Stationery Office. 1937. 5*d*.

regulation. The distinction is not made elsewhere in the regulations nor is it found in any of the international sanitary conventions. Should mild small-pox again become epidemic in this country, it is likely that trouble with continental countries may arise over this clause.

Duties are laid on commanders of aircraft similar to those laid on commanders of vessels—e.g., of notifying deaths and cases of infectious disease on board, of making entries on sanitary matters in their journey log-books and of complying with directions given them by authorised sanitary officers. Charges for sanitary measures can be recovered by a local authority undertaking the work but the charge must not exceed the actual cost of the work.

If a comparison is made between these regulations and the international convention on which they are based some few further points of difference will be noted. For example, the convention requires a sanitary aerodrome to have "one or more sanitary inspectors" as well as at least one medical officer; the regulations merely require "at least one assistant officer" acting under the medical officer; also no provision is made in the regulations for implementing Article 14 of the convention which forbids "aircraft in flight to throw or let fall matter capable of producing an outbreak of infectious disease." Perhaps, however, it is considered that the point is covered by Article 13 of the Consolidated Air Navigation Orders; this forbids any article, save ballast, to be dropped from an aircraft in flight.

THE RISKS

What are the risks of the introduction of cholera, plague, typhus, yellow fever, and small-pox into this country by aircraft or their passengers? It is true that aircraft may easily arrive in this country within the 5–14 days' incubation period recognised by the convention for these various diseases. It is true that —in the Far East—a death from cholera has occurred on a plane and another death arose from it. It is true that a rat has been carried on a plane and that an immense variety of insect life has been found in aircraft in various parts of the world.[2] On the other hand, Great Britain is in the fortunate position that nearly all aircraft coming from areas in which the Big Five diseases are endemic or epidemic would naturally land in other countries before they arrived here: hence our first line of defence is in the hands of others and the responsibility does not rest primarily with us. Secondly, except in the case of small-pox, conditions in this country do not favour the spread of these diseases even if introduced.

Indeed, the main importance of the new regulations is that they fulfil an international obligation and provide machinery and powers against a danger which for this country is at present more theoretical than real but may not always be so.

OBITUARY

MALCOLM BRICE SMYTH, M.B. Dubl.

THE death of Dr. Malcolm Smyth in Belfast a month ago came after a comparatively short illness. Until near the end of his life he was in his usual good health and actively engaged in hospital work and practice, and the end was a shock to his many friends and patients.

Malcolm Smyth is described as a man with few equals—a much-loved colleague, a skilled physician, an example of the best type of family doctor, and a good sportsman. He graduated from Trinity College, Dublin, in 1900, and went to the Royal Victoria Hospital, Belfast, first as house surgeon. At the time of his death he had been nearly thirty years on the staff of the hospital, which was founded by his father and the late Sir John Fagan. For several years he was also a member of the honorary staff of the Belfast Maternity Hospital. At last year's meeting of the British Medical Association in Belfast he was a vice-president of the section of diseases of children.

Sir Robert Johnstone writes: "The death of Malcolm Brice Smyth brings to a close the service to medicine of a family which for two generations took a high and honourable place in the medical life of Belfast. His father and his elder brother were both on the staffs of the Maternity Hospital and of the Queen-street Children's Hospital, and were active in their management. Not long after Malcolm commenced practice in Belfast his elder brother died, and he took the vacant places in the two hospitals. He gave yeoman service at the Maternity Hospital until 1922, when he retired from the active staff, but he remained connected with the Children's Hospital until his death. Much of his best work was done there, and his skill, his patience, and his kindly common sense endeared him to patients and colleagues alike. He commanded the confidence and enjoyed the friendship of a wide circle of private patients, and justly, for as a Belfast consultant said to me after his death, 'of all the practitioners I have met, Malcolm Smyth knew most about the case and about the patient. He was very thorough.'

"No notice of him would be complete which did not mention his fondness for field sports. The rod and the gun had claimed him for their own and he was never happier than when out on the moor, or the bog or the river. In his youth he was a prominent rugby man, and had been captain of the Trinity fifteen. His marriage was an ideally happy one, and to his wife and his three daughters goes out the sympathy of his many medical friends who have lost in him a valued colleague, the last of a family who in their lives worthily upheld the highest and best traditions of medicine."

ERNEST EDWARD AUSTEN, D.S.O., F.Z.S.

Major Austen was not a member of the medical profession. He was a zoologist. But his work gave him an intimate contact with the development of tropical medicine in this country.

His connexion with the British Museum dated from 1889, and from 1927 to 1932, when he retired, he was keeper in entomology. To scientists at large he will be best known for his momentous work on tsetse flies. From a monograph appearing in 1903 this was expanded in 1911 into a handbook superbly illustrated by Signor Terzi, and it has remained the standard work ever since. When he began the study of the tsetse flies only two species had been recognised, but in his last survey in 1922, in collaboration with E. Hegh, no less than twenty-two were described and their life-histories worked out. One of them, *Glossina austeni*, bore his name.

[2] E.g., Symes, C. B., *Bull. Off. int. Hyg. publ.* 1936, **28**, 1357; *Publ. Hlth Rep., Wash.* 1937, **52**, 414; H. Richards, communication by the delegate for the Anglo-Egyptian Sudan to the International Office at the October, 1937, session.

Austen's special subject being the diptera, he worked widely in this group and produced many studies on other species of blood-sucking insects, while his work on the common house-fly was put into practical use during the late war in Egypt and Palestine. In 1895–96 he served as a naturalist on board Siemens Bros. cable-ship, the *Faraday*, on the Amazon, and in 1899 he accompanied Sir Ronald Ross to Sierra Leone with the first expedition of the Liverpool School of Tropical Medicine to devise practical prophylactic measures against anopheles mosquitoes. In much of his later work he was intimately associated with Sir Patrick Manson at the London School of Tropical Medicine. He was also one of the mainstays in the establishment of the Royal Society of Tropical Medicine and Hygiene and served for many years on its council, later becoming a vice-president. Apart from his research work his services were constantly in demand as a member of departmental committees at the Colonial Office.

A man of particularly fine physique and of soldierly bearing, Austen was a keen volunteer and later a territorial. He served with the C.I.V.'s in the South African War, obtaining the Queen's medal with four clasps. In the late war he went to France in 1914 and commanded a company of the Artists' Rifles. Later he was transferred to the Egyptian Expeditionary Force for special duty on malaria and other fly-borne diseases, and he gave yeoman service for the next 3½ years, being mentioned in dispatches and awarded the D.S.O. His work played no small part in the successful issue to Allenby's Palestine campaign.

Austen impressed acquaintances as well as friends by a certain loftiness and nobleness of character. He was a delightful and learned companion and was much sought after in officers' messes during the war for his powers of conversation and his wide knowledge of military history. He was a fluent writer and a good speaker. His advent in a camp, although particularly welcome, was not always looked upon with favour by medical officers in charge of sanitation in desert areas, for even on the hottest day his walking pace would often average 5½ miles an hour.

He died on Sunday last at the age of 70, leaving two daughters.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JAN. 8TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 2139; diphtheria, 1584; enteric fever, 24 (23 "expected"); pneumonia (primary or influenzal), 1626; puerperal pyrexia, 192; cerebro-spinal fever, 37; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 3; dysentery, 256; ophthalmia neonatorum, 112. No case of cholera, plague, or typhus fever was notified during the week.

*The number of cases in the Infectious Hospitals of the London County Council on Jan. 14th was 4204, which included: Scarlet fever, 778; diphtheria, 1428 (diphtheria carriers, 27); measles, 541; whooping-cough, 336; puerperal fever, 17 mothers (plus 13 babies); encephalitis lethargica, 281; poliomyelitis, 2. At St. Margaret's Hospital there were 23 babies (plus 11 mothers) with ophthalmia neonatorum.

Deaths.—In 125 great towns, including London, there was no death from small-pox, 8 (1) from enteric fever, 36 (5) from measles, 5 (1) from scarlet fever, 20 (4) from whooping-cough, 49 (8) from diphtheria, 64 (19) from diarrhœa and enteritis under two years, and 77 (7) from influenza. The figures in parentheses are those for London itself.

Five deaths from typhoid were reported from Croydon, 1 each from Willesden and Derby. Liverpool had 7 deaths from measles, Manchester 5, Wigan 3. Liverpool also reported 4 deaths from whooping-cough, no other great town more than 2. Diphtheria was fatal in 33 great towns, Liverpool reporting 5 deaths, Manchester 3.

The number of stillbirths notified during the week was 275 (corresponding to a rate of 37 per 1000 total births), including 52 in London.

MEDICAL NEWS

University of Oxford

At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR B.M., CH.B.

Pathology.—T. W. Branch, J. T. Burrowes, N. F. E. Burrows, C. D. Cormac, H. J. L. Dickinson, E. S. Elliott, S. E. Furber, M. W. Hemans, S. J. S. Hughes, F. J. Ingham, S. H. Llewellyn-Smith, J. B. Longmore, J. N. Macdonald, G. K. McGowan, Eileen M. R. McKee, Margaret M. Pickles, R. A. Shawyer, W. A. H. Stevenson, G. D. Walker, G. J. Walley, R. T. Warren, and C. W. M. Whitty.

Forensic Medicine and Public Health.—J. C. G. Abraham, J. M. Almond, J. S. Astbury, J. B. Atkins, T. W. Branch, W. D. Brinton, D. R. Cargill, D. L. P. de Courcy, C. Exell, A. W. Frankland, W. M. Gibson, J. C. Gillett, E. H. Hiley, S. H. Llewellyn-Smith, M. Mandelstam, E. M. Poulton, C. W. R. Rayne-Davis, E. B. G. Reeve, J. Scholefield, A. Shannon, R. G. Silver, M. A. Slee, Celia K. Westropp, R. R. Wethered, and L. L. Whytehead.

Medicine, Surgery, and Obstetrics.—L. B. Bok, R. C. Browne, D. G. W. Clyne, H. J. L. Dickinson, F. G. Ethiraj, T. Gadian, S. R. Gloyne, F. J. Ingham, D. A. Ireland, J. E. Lovelock, H. Muller, C. I. Murphie, H. G. O. Owen-Smith, J. A. Partridge, I. B. Pirie, J. C. Prestwich, C. W. R. Rayne-Davis, R. Roaf, N. Stidolph, C. M. F. Walters, and D. Whitteridge.

Mr. H. L. A. Tarr, of the Rothamsted Experimental Station has been appointed to the Sir William Dunn Institute of Pathology. He is to investigate the chemistry of the bacteria responsible for certain human diseases.

Royal College of Surgeons of England

A meeting of the council was held on Jan. 13th with Sir Cuthbert Wallace, the president, in the chair. The Hallett prize was granted to Mr. B. A. E. Johns, of the University of Birmingham. Mr. W. F. Davis was appointed assistant secretary to the college. It was reported that at the recent primary examination for the F.R.C.S. held in New Zealand 7 candidates out of 14 were successful in passing the examination.

Mr. Hugh Lett was appointed the representative of the college on the council of the Queen's Institute of District Nursing. Mr. W. Sampson Handley was appointed Hunterian orator for 1939, Prof. R. E. Kelly Bradshaw lecturer for 1938, and Sir Humphry Rolleston Thomas Vicary lecturer for 1938.

The following hospitals were recognised for the six months' surgical practice required of candidates for the final fellowship examination: the Royal Hospital, Richmond (resident medical officer and senior house surgeon) and St. John's Hospital, Lewisham (resident surgical officer and house surgeon).

A diploma of membership was granted to D. A. Richmond, of the University of Manchester, and the following diplomas were granted jointly with the Royal College of Physicians of London:

D.P.M.—T. J. K. Brownlees, D. F. Buckle, J. P. Child, H. B. Craigie, A. G. Crisp, Harry Fischgold, W. H. Fraser, Gertrude M. Jefferson, James Littlewood, K. O. Milner, J. D. Richardson, P. H. Sandifer, Mahabir Singh, Pauline W. M. C. Stirling, F. H. Taylor, J. C. S. Thomas, and John Walsh.

D.L.O.—A. S. de B. Cocks, G. S. Dhillon, G. A. M. Knight, H. P. Lawson, and George Phillips.

D.A.—W. E. Brown, A. H. Diamond, Hugh Hunter, Kathleen M. Lyon, Kathleen L. Oldham, and E. S. Rowbotham.

International Congress for Microbiology

The third International Congress for Microbiology will be held in New York from Sept. 2nd to 9th, 1939, under the presidency of Dr. T. M. Rivers. The nine sections of the congress and their convenors are as follows: general biology, variation, and taxonomy (C.-E. A. Winslow); general biology, microbiological chemistry and physiology (Stuart Mudd); viruses and viral disease (W. A. Sawyer); rickettsiæ and rickettsial diseases (Hans Zinsser); protozoology and parasitology (H. W. Stunkard); fungi and fungous disease (B. O. Dodge); medical and veterinary bacteriology (F. P. Gay); agricultural and industrial microbiology (S. A. Waksman); and immunology (M.

Heidelberger). The general secretary of the congress is Prof. M. H. Dawson, College of Physicians and Surgeons 620 West 168th-street, New York City. Dr. R. St. John-Brooks, Lister Institute, Chelsea Bridge-road, London, S.W.1, is hon. secretary to the British committee.

University of London

Mr. P. G. Scott, chief assistant in the ear department of St. Bartholomew's Hospital, has been appointed to the Geoffrey E. Duveen travelling studentship in otorhinolaryngology for another year.

The Henry Tonks memorial committee has given the university an endowment to provide an annual prize in the Slade School of Fine Art.

Society of Apothecaries of London

The Gillson scholarship in pathology for 1938 has been awarded to Dr. R. H. S. Thompson of the Rockefeller Institute Hospital.

Fellowship of Medicine

A debate on the motion that the law on abortion requires reform has been arranged by the Fellowship and will be held at 1, Wimpole-street, London, W., on Feb. 9th at 8.30 P.M. Sir Beckwith Whitehouse will propose the motion and Dr. W. H. F. Oxley will oppose it. Members of the medical profession and of the Medico-Legal Society may obtain tickets from the secretary of the Fellowship, 1, Wimpole-street, W.1.

St. John's Hospital for Diseases of the Skin, London

Beginning on May 7th the out-patient clinic which is held at this hospital on Saturday afternoons will be held instead on Saturday mornings from 9.30 to 11.30.

Congress of Hepatic Insufficiency

The second Congress of Hepatic Insufficiency will be held at Évian from Sept. 21st to 24th under the presidency of Prof. F. Rathery. Further information may be had from the secretariat of the congress, 138, Avenue des Champs Élysées, Paris, VIII.

British Postgraduate Medical School

On Feb. 2nd, 9th, and 16th at 4.30 P.M. Dr. J. G. Greenfield (and not Dr. Dorothy Russell as stated in our columns last week) will lecture at this school. He will speak on neuropathology: the reaction of nervous tissues to disease. Dr. Russell will lecture at the school on Feb. 23rd, March 2nd and 9th on tumours of the central nervous system and meninges.

Order of the Nile

The King has given Prof. R. S. Dobbin permission to wear the insignia of grand officer of the Order of the Nile which has been conferred upon him by the King of Egypt in recognition of his services in the employment of the Government. Permission has also been given to Major W. L. Forsyth and Major R. J. Rosie to wear the insignia of commander of the order.

Malnutrition and Misleading Advertisements

Addressing the Food Education Society at the annual conference of Educational Associatons held in London on Jan. 6th, Dr. Macpherson Lawrie said that the effort to improve national health was being partially frustrated by "a vast counter-organisation which lives on advertising and encouraging the consumption of manufactured and impoverished foodstuffs." On every side poverty was made the primary excuse for the wide prevalence of malnutrition; yet money that might be spent profitably on valuable food was increasingly enticed into less deserving channels by the sensational claims of uncensored advertisements. Certain food preparations were sound and their method of advertising was justified and reasonable. A public inquiry undoubtedly would be to their advantage because it would remove unwholesome competition. Associated with the artificial food interests were the corrective-drug interests. All the manufactured food preparations were advertised with equal glamour and all promised health; nevertheless the patent-medicine department continued, increasingly, to sell its remedies in every home. Dr. Lawrie asked for some official guarantee of value. The public was in the dark; it could not easily sort the good products from the bad, and in consequence, as often as not, it paid through the chemist's shop the initial tax of ignorance.

Tavistock Clinic

During the week April 4th to 8th Prof. C. G. Jung of Zurich will give four lectures for medical practitioners at the clinic. He will speak on personal and racial factors in the production of the psychoneuroses, on symbolism in organic disorders, and on personal and social prophylaxis of the psychoneuroses. He will also give one public lecture. Further information may be had from the educational secretary of the clinic, Malet-place, London, W.C.1.

Hospitals for Civilian Casualties

The whole of the hospital accommodation of the country is to be surveyed so that arrangements can be made for civilian casualties in the event of an emergency. This will include the clearing hospitals ear-marked by the local authorities under their air raid precaution schemes.

The survey will be undertaken in England by the general inspectors of the Ministry of Health and certain selected medical officers, in Wales by the Welsh Board of Health and in Scotland by the Department of Health for Scotland. The officers have been instructed to confer in the first instance with the medical officers of health concerned and with representatives of the voluntary and other hospitals.

Progress of Housing

In his presidential address to the annual Conference of Education Associations Sir Kingsley Wood, the Minister of Health, said that 3½ million houses had been built in England and Wales since the Armistice. We were also now within measurable distance of achieving the removal of a million persons from the slums to new and good housing conditions. Housing production was still high, and the number of houses under construction at the end of November was 71,620—a new record. One of the most hopeful features of present housing progress was that the number of small houses built for letting was steadily rising. More housing however needed to be done for the countryside. If young people were to remain there and produce families they must be provided with conditions in which they could settle down to a happy, healthy, and comfortable domestic life.

Vacancies

For further information refer to the advertisement columns

Aberdeen University.—Lecturer in Bacteriology, £500–£600.
Auckland Hosp. Board.—Radiotherapist and Radiologist, each £1000.
Bexhill Hosp.—Res. M.O., at rate of £150.
Blackburn, Brockhall Certified Institution for Mental Defectives, Langho.—Deputy Med. Supt., £750.
Blackburn County Borough.—Asst. M.O.H. and Asst. School M.O., £600.
Cardiff City Mental Hosp., Whitchurch.—H.P., at rate of £200.
Cardiff Royal Infirmary.—Res. Surg. O., £200.
Eastbourne, Princess Alice Hosp.—Res. H.S., £150.
Finchley Borough.—Asst. M.O. for Maternity and Child Welfare, 1½ guineas per session.
Gloucestershire Royal Infirmary.—Res. Surg. O., £200.
Godalming, County Sanatorium, Milford.—Jun. Asst. Res. M.O., at rate of £250.
Guildford, Royal Surrey County Hosp.—Hon. Surgeon and Gynæcologist. Also Hon. Surgeon.
Hertfordshire County Council.—Asst. County M.O. and M.O.H., £800.
Hosp. for Sick Children, Great Ormond-street, W.C.—Asst. Pathologist, £400. Cas. M.O., at rate of £175. Also Two Anæsthetists, each 15 guineas.
Hull Royal Infirmary.—H.S. to Ophth. and Ear, Nose, and Throat Depts., at rate of £150.
Ipswich, East Suffolk and Ipswich Hosp.—Cas. O., £144.
Iraq Government.—Obstetrician and Gynæcologist, £150 Dinars per mensem. Also Ear, Nose, and Throat Specialist and General Surgical Specialist, each 120 Dinars per mensem.
Keighley and District Victoria Hosp.—Second Res. M.O., at rate of £120.
King's College Hosp., Denmark Hill, S.E.—Asst. Physician.
Lancaster County Mental Hosp.—Asst. M.O., £500.
Leicester Royal Infirmary.—Part-time V.D. Officer, £350.
Liverpool and District Hosp. for Diseases of the Heart, Oxford-street.—H.P., at rate of £100.
London Chest Hosp., Victoria Park, E.—H.P., at rate of £100.
London County Council.—Asst. M.O.'s for Mental Services, each £470. Also Asst. M.O.'s, Grade I and II, £350 and £250 respectively.
Lord Mayor Treloar Cripples' Hosp., Alton.—Third Res. M.O., at rate of £150.
Maidstone, West Kent General Hosp.—H.P., £175.
Manchester, Ancoats Hosp.—Pathologist and Radiological Officer, each £400. Also Cas. O., £250.
Manchester, Christie Hosp. and Holt Radium Institute, Withington.—Res. Surg. O., at rate of £150.

Manchester Northern Hosp.—Hon. Asst. Physician for Children.
Mansfield and District General Hosp.—H.S., at rate of £150.
National Hosp., Queen-square, W.C.—H.S., £100.
Persian Gulf, Bahrain Government.—M.O., 1400 Rs. per month.
Plymouth, Prince of Wales's Hosp., Greenbank-road.—H.S., at rate of £120.
Plymouth, Prince of Wales's Hosp., Lockyer-street.—H.S., at rate of £150.
Portsmouth Royal Hosp.—H.P., H.S. to Orthopædic Dept., and Cas. O., each at rate of £130.
Queen's Hosp. for Children, Hackney-road, E.—H.S. and Cas. O., each at rate of £100.
Radium Institute, Riding House-st., W.—Res. M.O., at rate of £420.
Rochdale, Birch Hill Hosp.—Jun. Res. M.O., at rate of £225.
Rotherham, Alma-road Hosp.—Obstet. M.O. and Deputy Med. Supt., £750.
St. Albans, Hill End Hosp. and Clinic, &c.—Third Asst. M.O., £425.
St. Albans and Mid Herts Hosp.—Con. Physician and Con. Surgeon.
St. Leonards-on-Sea, Buchanan Hosp.—Hon. Surgeon.
Sheffield, Jessop Hosp.—Res. Anæsthetist, at rate of £100.
South Eastern Hosp. for Children, Sydenham, S.E.—Hon. Pathologist, £50.
Surrey County Council.—A.M.O., £600.
Tilbury Hosp.—H.S., at rate of £140.
Ventnor, Royal National Hosp. for Consumption, &c.—Second Asst. Res. M.O., at rate of £200.
Wakefield, Clayton Hosp.—H.S., at rate of £200.
Wakefield, Scotton Banks Sanatorium.—Sen. Asst. M.O. and Deputy Med. Supt., £450.
Weir Hosp., Grove-road, Balham, S.W.—Sen. and Jun. Res. M.O.'s, £250 and £150 respectively.
Woking and District Victoria Hosp.—Res. M.O., at rate of £130.
Wolverhampton Royal Hosp.—H.S., at rate of £100.

Specialist Medical Referee under the Workmen's Compensation Act, 1925, for dermatological cases in the Bradford, Keighley, Otley, Skipton, Dewsbury, Wakefield, Halifax, and Huddersfield County Courts (Circuit No. 12), and possibly some other County Courts. Applications should be addressed to the Private Secretary, Home Office, Whitehall, London, S.W.1, before Feb. 7th.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Radstock (Somerset), Cleobury Mortimer (Salop), Fordoun (Kincardine), Callander (Perth), and Dunkeld (Perth).

Medical Diary

January 24th to January 29th

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY.
Odontology. 8 P.M.
Prof. H. H. Stones: Association of Traumatic Occlusion with Parodontal Disease. Mr. Alvan T. Marston: Relation of Deciduous and Permanent Molars in the Ox.
WEDNESDAY.
Comparative Medicine. 5 P.M.
Prof. N. Dungal (Reykjavik) and Mr. E. L. Taylor (Weybridge), Epizoötic Adenomatosis, a Lung Disease of Icelandic Sheep. Mr. R. F. Gordon: Rapid Methods of Diagnosis of the Commoner Diseases of Poultry.
THURSDAY.
Urology. 8.30 P.M.
Mr. L. N. Pyrah and Mr. F. S. Fowweather: Renal Calculi, Renal Disease, and Hyperparathyroidism. Mr. A. R. Thompson: The Nervous Element in Urinary Disease.
FRIDAY.
Disease in Children. 5 P.M. (Cases at 4.15 P.M.)
Dr. Alan Moncrieff: Thymic Enlargement in Infants with Special Reference to So-called Status Lymphaticus. Dr. G. Slot and Dr. G. Lynch Burgess: 1. Gargoylism. Dr. Reginald Lightwood and Dr. T. Colver: 2. Nervous Symptoms Ascribed to Kernicterus. Dr. D. Gairdner (for Dr. E. A. Cockayne): 3. Recurrent Lobar Collapse. Dr. Irene Yates: 4. Long-standing Dementia.
Epidemiology and State Medicine. 8.15 P.M.
Dr. Philip Stock: The Use of Some Lethal Gases in Hygiene.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.
MONDAY.—8.30 P.M., Dr. J. C. White (Massachusetts), Sir Thomas Lewis, Prof. E. D. Telford, and Prof. J. R. Learmonth: Recent Advances in Surgery of the Sympathetic Nervous System.

MEDICO-LEGAL SOCIETY.
THURSDAY.—8.30 P.M. (Manson House, 26, Portland-place, W.), Major D. P. Lambert: Some Aspects of Medico-legal Work in India.

ASSOCIATION OF CLINICAL PATHOLOGISTS.
SATURDAY.—9.30 A.M. (St. George's Hospital, S.W.), Communications.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS.
FRIDAY.—5 P.M. (London School of Hygiene, Keppel-street, W.C.), business meeting. 6 P.M., Dr. S. W. Fisher: The Health of the Coal-miner. Dr. A. J. Amor: Radiology and Pneumoconiosis. Dr. Fisher, Dr. Amor, Dr. E. R. A. Merewether, Dr. C. L. Sutherland, and Dr. A. Meiklejohn: Demonstration.
SATURDAY.—10 A.M., Visit to Home Office Industrial Museum, Horseferry-road, S.W.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.
FRIDAY.—8.30 P.M. (11, Chandos-street, W.), Prof. A. Bessemans: Experimental Data on Antisyphilitic Hyperthermia produced by Physical Agents.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1, Thornhaugh-street, W.C.
Fever Hospital Medical Service Group.
FRIDAY.—4 P.M., Dr. E. W. Goodall and Dr. A. Topping: Prevention and Treatment of the Enteric Diseases.

BRITISH PSYCHOLOGICAL SOCIETY.
Medical Section.
WEDNESDAY.—8.30 P.M. (17, Bloomsbury-square, W.C.), Prof. J. E. Marcault: Relationship of Consciousness and the Functional Activities of the Organism.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
MONDAY.—5 P.M., Mr. W. E. Underwood: Recent Observations on the Pathology of Hydronephrosis.
WEDNESDAY.—5 P.M., Mr. J. I. Munro Black: The Lymphoepitheliomata.
FRIDAY.—5 P.M., Mr. Maxwell Ellis: The Function of the Bronchial Tubes. (Hunterian lectures.)

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland-place, W.
WEDNESDAY.—3.30 P.M., Dr. H. L. Oldershaw: History of Public Health.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane-road, W.
TUESDAY.—4.30 P.M., Prof. Arthur Ellis: Nephritis.
WEDNESDAY.—Noon, clinical and pathological conference (medical). 2 P.M., Mr. E. J. King: Hepatic Function and Jaundice. 3 P.M., clinical and pathological conference (surgical). 4.30 P.M., Dr. Cuthbert Dukes: Surgical Pathology of Tumours of the Genito-urinary Organs.
THURSDAY.—2.15 P.M., Dr. Duncan White: Radiological Demonstration. 3.30 P.M., Prof. J. Chassar Moir: Anæsthesia and Analgesia.
FRIDAY.—2 P.M., clinical and pathological conference (obstetrics and gynæcology).
Daily, 10 A.M. to 4 P.M., medical clinics, surgical clinics and operations, obstetrical and gynæcological clinics and operations.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE Hammersmith, W.
MONDAY.—10 A.M.: Dr. H. W. A. Post: X ray film demonstration, skin clinic. 11 A.M., surgical wards. 2 P.M., operations, surgical, and gynæcological wards, medical, surgical, and gynæcological clinics. 4.15 P.M., Mr. Arnold Walker: Obstetric Shock.
TUESDAY.—10 A.M., medical wards. 11 A.M., surgical wards. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. Geoffrey Konstam: Rheumatic Heart Disease.
WEDNESDAY.—10 A.M., children's ward and clinic. 11 A.M., medical wards. 2 P.M., gynæcological operations, medical, surgical, and eye clinics. 4.15 P.M., Mr. Harvey Jackson: Surgical Relief of Pain.
THURSDAY.—10 A.M., neurological and gynæcological clinics. Noon, fracture clinic. 2 P.M., operations, medical, surgical, genito-urinary, and eye clinics.
FRIDAY.—10 A.M., medical wards, skin clinic. Noon, lecture on treatment. 2 P.M., operations, medical, surgical, and throat clinics. 4.15 P.M., Dr. V. S. Hodson: Pneumonia.
SATURDAY.—10 A.M., children's and surgical clinics. 11 A.M., medical wards.
The lectures at 4.15 P.M. are open to all medical practitioners without fee.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY.—2 P.M., Dr. W. J. Pearson: Infant Feeding: on the Bottle. 3 P.M., Dr. R. T. Brain: Some Skin Diseases in Infancy.
Out-patient clinics daily at 10 A.M., and ward visits at 2 P.M.

ST. GEORGE'S HOSPITAL, S.W.
THURSDAY.—5 P.M., Dr. E. T. O. Slater: Psychiatric Demonstration.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale W.
THURSDAY.—3 P.M., Dr. Antony Feiling: clinical demonstration.

CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C.
FRIDAY.—4 P.M., Mr. J. D. McLaggan: Acute Mastoiditis.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY.—4 P.M., Mr. A. J. Gardham: Carcinoma of the Tongue.

ST. JOHN CLINIC AND INSTITUTE OF PHYSICAL MEDICINE, Ranelagh-road, S.W.
FRIDAY.—4.30 P.M., Dr. A. P. Cawadias: Physical Medicine in Diseases of the Nervous System.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle-street, W.C.
TUESDAY.—5 P.M., Dr. L. Forman: Sycosis.
THURSDAY.—5 P.M., Dr. G. Duckworth: Erythematosquamous Eruptions. (Chesterfield lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY to SATURDAY.—ST. PETER'S HOSPITAL, Henrietta-street, W.C., all-day course in urology (open only to members).—ST. JOHN'S HOSPITAL, 5, Lisle-street, W.C., afternoon course in dermatology (open to non-members).

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James' Hospital, Ouseley-road, S.W.
WEDNESDAY.—4 P.M., Col. L. W. Harrison: Gonorrhœa.

GLASGOW POST-GRADUATE MEDICAL ASSOCIATION.
WEDNESDAY.—4.15 P.M. (Western Infirmary), Mr. W. A. Campbell: Affections of the Hip-joint.

NOTES, COMMENTS, AND ABSTRACTS

DISEASES RESEMBLING PELLAGRA IN AFRICAN CHILDREN

IN 1926 Dr. R. A. W. Procter, who was working in the Kikuyu Reserve, described [1] a disease seen in quite young children which was almost always fatal. It was characterised by the extraordinarily light colour of the patient, who was usually brought to hospital because of swelling of the feet, and a history of slimy motions was commonly obtained. As the disease progressed the child became paler in colour; there was a curious black desquamation especially at the bends of the elbows and knees, and general œdema was sometimes observed.

In 1933 Dr. Cicely Williams described 20 somewhat similar cases seen on the Gold Coast, with 3 post-mortem examinations. She postulated a nutritional deficiency, but excluded pellagra for various reasons including the distribution of the eruption.[2]

In the following year Dr. R. U. Gillan, unaware of the previous publications, described 12 cases of a mysterious form of fatal œdema occurring in infants in the Kikuyu country. He had 2 necropsies but beyond a fatty condition of the liver nothing abnormal was noted; the children passed large fatty stools, and both hypochromic and hyperchromic anæmia were present. Gillan discussed the relationship of the disease to cœliac disease, sprue, and pink disease, and later several cases were recorded in Kenya and Uganda under the name of Gillan's œdema. On the West Coast the native name of *Kwashiorkor* was applied to it.

Dr. Trowell [3] has published an account of 26 cases observed at the Nairobi Native Hospital and 20 other cases seen in the Kikuyu Reserve hospitals. With 2 exceptions the patients were Kikuyu children between six months and four years old, and as a rule they were brought to hospital about a month after the alleged onset. The early symptoms were irritability, photophobia, a disinclination to stand or run about, some anorexia, and puffiness of the hands and feet. Œdema was nearly always present; in mild cases it was limited to the hands, feet, and face; in more severe cases it was general. The appearance suggested nephritis, but this was negatived by urine analysis. Pyuria was occasionally found. On the disappearance of the œdema before death or on improvement the child was found to be emaciated.

The eruption consisted of jet-black areas of hyperkeratosis very slightly elevated above the surface; they varied in size but by coalescence might involve large areas of the trunk. These patches tended to exfoliate and left pale or pink areas of skin. Generalised loss of pigmentation of the integument was constant, and these pale coffee-coloured children formed a striking contrast to the normal black babies in the wards. The older patches looked as if black varnish had been painted on the skin, and many of them were fissured so that the surface resembled a "crazy pavement"—an apt description used by Dr. Williams.

Angular stomatitis was always found and excoriations were present at the angles of the mouth, around the nostrils and canthi and about the anus and also about the external genitals and scrotum. The hair was always scanty but what remained of it was of a chocolate or coffee colour or even grey and white. It was brittle and had lost its natural curliness. The nails were soft and brittle and ridged lengthwise. The hair and nails recovered with convalescence.

Trowell found the same gastro-intestinal conditions as had been described by Gillian and others. Fatal cases had almost persistent diarrhœa. Hypertonia and hypotonia were observed but it was impossible to make an adequate examination of the nervous system.

Kikuyu children are always breast-fed, usually for a long time, but the breast milk is supplemented by cooked maize at a very early age, the food being masticated by the mother before being given to the infant. Trowell looks upon the condition as being an infantile pellagra and still rather inclines to the zeist hypothesis, and he therefore treated it by diet. Among the 26 patients 9 died (some were admitted in extremis), 5 improved but were taken away by impatient parents before complete recovery, and 10 left hospital free from all signs of illness and did not return. The treatment consisted in the administration of Marmite (one teaspoonful daily for each year of age) with eggs and in severe cases liver. A pint of milk was consumed every day, and a mixture containing iron and calcium lactate was prescribed. Oranges and cod-liver oil were also given but were not thought essential.

Six post-mortem examinations were performed by Dr. F. W. Vint, senior pathologist, at the Nairobi Research Laboratory, and the outstanding feature of the cases was found to be atrophy of the thymus gland—so far advanced that it was sometimes impossible to recognise the thymus at all. (The autopsies were performed within 12 hours of the decease.) The other features were fatty degeneration of the liver and a peculiar smooth transparent condition of the small intestine. The exanthem showed microscopically the features noted by Denton in negro pellagra.

[1] Procter, R. A. W., *Kenya med. J.* 1926, **3**, 280.
[2] See Williams, C. D., *Lancet*, 1935, **2**, 1151.
[3] Trowell, H. C., *Arch. Dis. Childh.* 1937, **12**, 193.

A VARICOSE ULCER SURVEY

THE very frequency of varicose ulcers seems to have stifled interest in them, and in some countries the disinclination of certain surgeons to admit sufferers to hospital is as notorious as it is deplorably excusable. Hitherto scant attention has been paid to varicose ulcers as a social problem of enormous but ill-defined dimensions. To make good this omission the Danish Medical Society gave it the place of honour at its annual meeting in 1937. They had set Dr. Kaj Roholm the task of undertaking a social survey, the findings of which he presented at the meeting.[1] His figures refer to all forms of ulcus cruris, but the syphilitic, tuberculous, diabetic, and arterio-sclerotic lesions in the lower part of the leg were numerically negligible. The material studied consisted of illustrative samples. One sample was of the 578 cases treated at the Rudolph Bergh Hospital in Copenhagen in the 5-year period 1931–35; another was the 263 patients whose claims to sickness benefit were settled by law; a third, the 337 patients who belonged to a friendly society and who, in 1936, were notified as suffering from ulcus cruris. Out of this total of 1178 patients, as many as 856 were women—a sex ratio the opposite of that given by many text-books. Yet another sample consisted of the 7520 cases treated in the hospitals of Copenhagen and Frederiksberg in the 35-year period 1901–35; in this group also the women greatly outnumbered the men. In the first five years of this period, the average number of cases per year was only 140, whereas in the second it was 316—a rise giving the lie to the at least premature assumption that the injection treatment of varicose veins and certain other factors have begun to stamp out these ulcers.

On the basis of his figures, Dr. Roholm calculates that Denmark, with a population of 2·8 millions above the age of 14, has every year to cope with 10,000 to 15,000 cases severe enough to justify sickness benefit. In frequency, therefore, this disease ranks with pulmonary tuberculosis and cancer. But while the mortality from ulcus cruris under hospital treatment is only between 1 and 2 per cent.—among the series of 7520 hospital-treated cases there were 107 deaths due to causes directly connected with the

[1] *Hospitalstidende*, Nov. 9th, 1937, p. 23.

ulceration—and the whole may be put at only about 0·5 per 100,000, the corresponding figure for pulmonary tuberculosis must be somewhere between 40 and 80, and for cancer at about 150. This comparatively low mortality for varicose ulcer is of course comforting, but it must be balanced against its chronic and relapsing character. Dr. Roholm calculates that about 40 per cent. of the patients belonging to his first three samples had suffered for 5–20 years, and 27 per cent. for 20 years or more. He considers it one of the worst afflictions that can overtake anyone obliged to earn his living by bodily toil, and he paints a sad picture of the sufferings of these patients by night as well as by day. He estimates the cost to the community at about 2 million kroner a year. He concludes with suggestions for the improvement of this state of affairs, and among prophylactic measures he gives place of honour to energetic treatment of varicose veins. Another useful step would be an educational campaign encouraging patients to seek medical advice early, instead of first exhausting all the therapeutic ingenuity of home advisers and quacks.

DIPHTHERIA IN LYONS

Dr. Marie-Rose Lyathaud says that diphtheria, which was formerly rare in Lyons, became permanently installed there in endemo-epidemic form about the year 1880 (Thèse de Lyon, 1936–37, No. 188). Since the introduction of active immunisation the incidence has shown a decline, especially in quarters where inoculation has been compulsory. The fatality-rate has also shown a considerable fall thanks to antitoxin and general prophylactic measures. It is chiefly however since 1930 that the death-rate has diminished and the milder course of the disease has coincided with the introduction of active immunisation which is being employed on an increasing scale. Children still form the part of the population most affected by diphtheria, but whereas the fall of the incidence of diphtheria in childhood has been very pronounced since 1925, thus indicating the benefit derived from anatoxin (toxoid), the morbidity in adults during the same period has increased.

TEA FOR BURNS

THE use of ointments and of oily preparations such as carron oil in the first-aid treatment of burns has the serious disadvantage of complicating the application of tannic acid later. Peiris [1] suggests that every household has at hand in the family tea-pot the apparatus for preparing a suitable tannic-acid solution in an emergency, and that its employment is simple in the extreme. The proportion of tannic acid varies in different teas, an average black tea containing about 16 per cent. and a green 27 per cent., and the amount of this which passes into an infusion is also very variable, about 7 per cent. being extracted after five minutes and 16 per cent. after forty minutes infusing. In burns Peiris advises the infusion of six teaspoonsful of black tea in six teacupsful of boiling water for ten minutes. The tannic-acid content of this must be very low, but Peiris says it is effective. Four layers of clean handkerchiefs or sheeting are put to soak in the tea, and while it is cooling the clothing is cut away to expose the burnt parts. The tea compress is then applied direct to the burnt area and covered with a light bandage. Peiris uses a similar method at the Colombo General Hospital. There the parts are first cleaned with ether and blisters are cut away under morphia or an anæsthetic, and then six layers of gauze soaked in a fresh tea infusion containing acriflavine 1 in 1000 are applied and kept moist with tea for twenty-four hours. Unless there are signs of gross sepsis the dressings are left on for 12–14 days. The usual measures are taken to combat shock and toxæmia. Peiris describes 12 patients whom he has treated, 6 having extensive third-degree burns. In his early cases the applications consisted of compresses of moist tea-leaves from the ward pot, and later of lint soaked in tea prepared in the ordinary way in the ward. The burnt areas are said to have healed as rapidly as would have been expected with orthodox tannic-acid treatment, and there were no deaths. Though this method has obvious advantages as first-aid in the home, most hospital surgeons would prefer to have their tannic-acid solutions prepared in the dispensary rather than in the kitchen.

[1] Peiris, M.V.P., *Indian med. Gaz.* 1937, **72**, 718.

THE LIFE AND DEATH OF MOK

MOK, the late lamented male gorilla at the London Zoo, came with his female companion, Moina, from the French Congo in 1932. At that time they had both been in captivity over two years and had been well cared for by a local district commissioner, M. Capagorry, and his wife.

At this time Mok was about 3½ years old and Moina two years older. Both were tame up to a point, especially with Madame Capagorry, with whom they played for an hour or more every day. They were not found together but in different localities in the French Congo and at different times. Mok was a typical lowland gorilla (*Gorilla gorilla gorilla*), whereas Moina probably came from farther inland and is intermediate in form between the lowland type and the Kivu gorilla of the Belgian Congo (*Gorilla gorilla beringei*). The male of the latter species grows to a much greater size and weight than the lowland form. Mok, at his best last summer, weighed 320 lb. and Moina 252 lb., although when first brought to the Zoo in 1932 he weighed only 70 lb. against Moina's 112 lb. An adult male Kivu gorilla died at the Berlin Zoo last year, weighing 568 lb. Had Mok lived he would have probably never weighed more than 400 lb.

Although he had the appearance of being immensely strong and healthy, he was never so resistant to disease as Moina and he had two attacks of pneumonia, the first in the winter of 1932 and again a year later. During the first of these attacks it was possible to examine Mok and to percuss and auscultate his chest in the usual manner, as he was still in the approachable stage, but by the following winter, when he had his second attack, this was not so easy. By that time both gorillas had been transferred to the new house which was specially built for them and had become so rough in their play that even their keeper could not go in with them. It is interesting to note that the first attack of pneumonia which Mok had was definitely lobar in type and unlike the usual broncho-pneumonia of young chimpanzees, which resembles the broncho-pneumonia of children.

The following list gives an idea of the varied diet which is necessary to keep a gorilla in health in captivity.

	Per week.		Per week.
Grapes	14 lb.	Porridge	½ lb.
Bananas	42	Tea	2 oz.
Apples	14 lb.	Sugar	2½ lb.
Oranges	21	Bread	3½ hf.-qtns.
Prunes	2 lb.	Butter	6 oz.
Rhubarb (when in season)	3½ bdls.	Eggs	10
Tomatoes	2 lb.	Milk (condensed)	3 tins.
Lettuces	6	Milk (tubercle-free, irradiated)	7 quarts.
Greens	5 lb.	Cod-liver oil-cream	About ¼ pint.
Onions	2½ lb.		
Carrots	1½ lb.		

In addition to the above, Mok and Moina used to get a boiled chicken once a week, and sugar-cane, corn-cob, melons, cucumbers, and other delicacies when in season. They also had products rich in various vitamins. The cost to the Zoological Society of keeping this pair in food alone was at least £4 per week.

The special house which was designed by Messrs. Tecton is considered to be one of the most ingenious

and modern of all animal-houses. It is arranged in such a way that during the winter half of the circular house is reserved for the animals and half for the public, direct contact with the public being prevented by a movable screen of glass in addition to the bars of the cage. The glass, of course, is to prevent direct infection from visitors and improper feeding. During the summer, in addition to this interior cage, the animals are given the other half of the house which the public use in the winter time, and the visitors then look on from outside, being separated from the outside cage by a barrier 8 feet away from the bars of the cage. At this distance any infection is absent, or at any rate so attenuated as to be negligible.

The first signs of illness in Mok were noticed at the beginning of November last, when he lost his appetite and became listless. These symptoms increased until Christmas time when a slight improvement was noticed. This improvement, however, did not last and by the beginning of the New Year he was refusing all solid food and taking very little in liquid form. Owing to his strength and truculence, it was impossible to examine him in any way or even take his temperature, and apart from a certain amount of loss of weight and occasional diarrhœa he had no other symptoms of disease except that when he could be induced to open his mouth to take a drink, it appeared to be somewhat inflamed and injected. During the ensuing fortnight there were days when he seemed to rally and take a little more nourishment, while on other days he lay listless and refused even water. The question of giving him an anæsthetic for purposes of examination was considered, but was held not to be expedient owing to certain obvious difficulties in catching up the animal, with resulting exhaustion, and also because of slight lung symptoms which towards the end made themselves apparent. Mok died at 7.30 P.M. on Jan. 14th. The body was transferred immediately to the prosectorium and opened up in order to prevent decomposition. During that night, the brain was removed and injected and certain other organs, such as the testicles, were preserved for research purposes.

A very full post-mortem examination was made by Colonel A. E. Hamerton, pathologist to the Zoological Society. The findings post mortem were surprisingly few, and macroscopically it could not be said that anything could be found sufficient to cause death, the only obvious changes being some fatty degeneration of the liver and some changes in the cortex of the kidneys. A full microscopical examination of the tissues is being undertaken and also cultures have been taken from the blood. It is possible that the results of these may throw more light on the cause of Mok's illness and death.

G. M. V.

THE HOSPITAL DIARY (Messrs. Frederick Aldridge, 34, Paternoster-row, London, E.C.4) is designed for the use of house governors, matrons, pharmacists, and almoners. Adequate space is provided for the day's engagements, and the general information in front of the diary should prove a real stand-by to all engaged in hospital administration. At the end is a useful guide to hospital buyers. The price is 5*s*.

THE SERVICES

ARMY DENTAL CORPS

THE War Office announces vacancies for commissions in the Army Dental Corps. Candidates will be selected with competitive examination; they must be under 28 years of age and must be registered under the Medical Acts or Dentists Acts. Those selected will be given short-service commissions for six years, after which they will retire with a gratuity of £1000 unless they are granted permanent commissions. Further particulars appeared in our advertisement columns last week.

Appointments

BAKER, ALFREDA, M.D. Belf., F.R.C.S. Eng., Hon. Assistant Surgeon to the Elizabeth Garrett Anderson Hospital.

BUTTLE, R. L., L.R.C.P. Lond., Third Assistant Medical Officer at the West Sussex County Mental Hospital, Chichester.

EDWARDS, COLIN, M.B. Sydney, M.R.C.P. Lond., D.P.M., Assistant Physician to the Miller General Hospital, Greenwich.

ELLIOTT, W. A., M.B. Camb., M.R.C.P. Lond., Medical Registrar at the West London Hospital.

HARRISON, T. H., M.B. Sheff., D.P.H., Senior Assistant Medical Officer, School Medical Service, Plymouth.

HARRISON, T. H., M.B. Sheff., D.P.H., Chief Assistant County Medical Officer of Health for Cambridgeshire.

HILL, GLADYS, M.D. Lond., F.R.C.S. Eng., M.C.O.G., Hon. Assistant Obstetric Surgeon to the Elizabeth Garrett Anderson Hospital.

HOVELL, J. H., M.R.C.S. Eng., L.D.S., Chief Assistant to the Dental Department at St. Bartholomew's Hospital.

O'MALLEY, E. E., M.B. Dubl., Casualty Officer and Surgical Registrar at the King George Hospital, Ilford.

POTTER, C. T., M.D. McGill, M.R.C.P. Lond., Physician to the Children's Department of the West London Hospital.

POTTER, L. S., M.B. Manch., Assistant Secretary of the British Medical Association.

RALSTON, MARGARET M. R., M.B. Edin., Assistant Medical Officer at the Lancaster Mental Hospital.

RENNIE, J. L., M.B., F.R.F.P. & S. Glasg., D.P.H., Assistant Medical Officer for Ayr and Resident Medical Officer at Heathfield Hospital.

STRAUSS, E. B., D.M. Oxon., M.R.C.P. Lond., Physician to the Psychological Department at St. Bartholomew's Hospital.

Colonial Medical Service.—The following appointments, promotions, and transfers are announced:—

ALLEN, G. T., M.R.C.S. Eng., Medical Officer, West Africa;
CLARKE, J. H. C., M.B. Glasg., Medical Officer, Somaliland;
INNES, J. R. S., M.B. Belf., Medical Officer, West Africa;
LANCELEY, J. L., M.B. Liverp., Medical Officer, Uganda;
PATRICK, M. S., M.B. Belf., Medical Officer, West Africa;
DEALE, J. E., M.B. Dubl., F.R.C.S. Irel., Senior Medical Officer, Gibraltar; and
HENDERSON, J. A., M.B. Edin., D.T.M. & H., Senior Medical Officer, St. Vincent.

Births, Marriages, and Deaths

BIRTHS

BELL.—On Jan. 12th, at Uckfield, Sussex, the wife of Dr. Derek Bell—a son.

FOWLER.—On Jan. 9th, the wife of Dr. A. Francis Fowler—a daughter.

HENDERSON.—On Jan. 9th, the wife of Dr. F. Y. Henderson, Wimbledon, S.W.—a daughter.

HOLMAN.—On Jan. 11th, at Finchley-road, N.W., the wife of Dr. Geoffrey Holman—a daughter.

MURRAY.—On Jan. 14th, at Exmouth, the wife of Mr. J. Douglas Murray, F.R.C.S.—a son.

MARRIAGES

MCMANUS—WADDELL.—On Dec. 28th, at Gwelo, Southern Rhodesia, Thomas S. McManus, M.B., to Elsie Norah, youngest daughter of the late R. D. Waddell, of Ealing.

MOFFETT—LAING.—On Jan. 15th, at Moseley, Arthur James Moffett, F.R.C.S., to Isabella Murray, second daughter of Mr. Murray Laing, of Barnt Green.

MULLIGAN—CHAMBERLAIN.—On Dec. 30th, in Capetown, Bernard Joseph Mulligan, L.R.C.P., of Roscommon, Ireland, to Joan Katharine Chamberlain, of Iron Acton.

PARBURY—SALE.—On Jan. 5th, at Frogmore, W. K. Parbury, M.R.C.S., D.M.R.E., of Bedford, to Miss Muriel Sale.

THORNE THORNE—HARRIS.—On Jan. 15th, in London, Vernon Thorne Thorne, M.B., Colonial Medical Service, of Woking, to Edna Harris, of Redcar.

DEATHS

ANDREWS.—On Jan. 16th, at Norwich, Charles Horace Andrews, L.R.C.P. Edin., in his 76th year.

BRENAN.—On Jan. 11th, at Tonbridge, Kent, Alexander Richard Micklethwait Brenan, M.D. Camb., son of the late Canon Brenan, of Clifton, Bristol.

GIDLEY.—On Jan. 15th, at Cullompton, Devon, Gustavus George Gidley, M.R.C.S. Eng., L.S.A., aged 76 years.

GOTT.—On Jan. 17th, at Emsworth, Hants, Jeffrey Gott, L.S.A. Lond., late Surgeon, Orient S.N. Co.

MATHESON.—On Jan. 17th, at Plockton, Ross-shire, John Matheson, M.D. Aberd., aged 81.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.